

City of Flagstaff



DRAFT Active Transportation Master Plan

May 2021



Plan summary

The ATMP at a glance

The Active Transportation Master Plan, or ATMP, is a guide to enhancing walking and biking in Flagstaff. It is defined as a specific plan, which are intended to provide a greater level of detail for a specific element or topic in the Flagstaff **Regional Plan 2030 and to facilitate implementation of the Regional Plan's goals and policies.** The ATMP includes detailed information regarding pedestrian and bicycle accommodation, and makes specific recommendations for policies, strategies, projects, and programs to promote walking and biking.

Section 1 | Introduction

Establishes the foundation for the ATMP, including the policy context and the reasons why walking and biking are important. The Introduction sets forth a holistic, broad-based approach to both transportation planning and pedestrian and bicycle accommodation.

Section 2 | Current conditions

A summary of the current status of walking and biking based on mode share, safety statistics, facilities, and national indicators. This section also reports the results of community engagement efforts, summarizes our challenges, and highlights our opportunities.

Section 3 | Vision, goals, policies, and strategies

Articulates our vision for walking and biking in Flagstaff and establishes specific goals to support and guide our actions. Also includes an extensive list of actions we can take to promote walking and biking, organized around six topics.

Section 4 | Outcomes, measures, and targets

Lists the desired results of this plan, as well as measures and indicators to gauge how well we are achieving those results.

Section 5 | Implementation

Opportunities and recommendations for implementation of this plan, including a list of the first 10 things that should be done.

Section 6 | Walking and biking infrastructure

A summary of recommended and proposed pedestrian and bicycle facilities. Also explains the process to prioritize missing and needed sidewalks, bikeways, FUTS trails, enhanced crossings, and bridges and tunnels.

Section 7 | Planning considerations

Discussion of how various aspects of land use and transportation planning affect pedestrian and bicycle accommodation, and considerations for supporting walking and biking.

Section 8 | Design guidelines

Detailed information on best practices and design guidelines for pedestrian and bicycle accommodation, as well as street design guidelines that impact walking and biking.

Supporting documents

Infrastructure plans

These are supplemental documents that provide additional detail regarding the process for planning and prioritization of walking and biking infrastructure.

- Bikeways
- FUTS trails
- Sidewalks
- Enhanced crossings
- Grade-separated crossings

Working papers

The working papers include background information on a variety of topics that was used to help formulate the ATMP.

- WP01 Existing plans and policies
- WP02 Mode share information and trends
- WP03 Pedestrian and bicycle crash data
- WP04 Walking and biking survey results
- WP05 Pedestrian and bicycle comfort indices
- WP06 Attractors, generators, and social factors

Online maps

A series of online maps to allow in-depth exploration of planned pedestrian and bicycle facilities.

- Walking and biking infrastructure

- FUTURE plan
- Bikeways plan

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1 Introduction

The City of Flagstaff's **Active Transportation Master Plan** (ATMP) is a specific plan that is intended to serve as a detailed guide to enhance walking and biking in Flagstaff.

Walking and biking are important to Flagstaff, and the Flagstaff community is very supportive of walking, biking, transit, and active modes of transportation in general. Policies and programs to encourage walking and biking, as well as exemplary pedestrian and bicycle infrastructure, are critical elements of community mobility and a robust transportation system. A healthy environment for walking and biking are also crucial to achieve social, economic, health, environmental, and sustainability goals for the community.

Over the years, a variety of City of Flagstaff's plans and policy documents have highlighted the importance of walking and biking. However, none have provided specific details or direction on how to become a more pedestrian and bicycle friendly community. This document provides those details and that direction.

The **Active Transportation Master Plan** makes specific recommendations for strategies, actions, projects, and programs to improve the pedestrian and bicycle environment and implement the transportation goals and policies of the Flagstaff Regional Plan 2030.

Intent

The ATMP is intended to serve several functions:

- Provide detailed guidance for implementation of the goals and policies of the Regional Plan for walking, biking, and trails.
- Establish specific policy support for active transportation to build on and expand goals and policies already in the Regional Plan.
- Promote a shift in how we conduct transportation planning, away from a model that prioritizes automobiles and vehicular travel and towards a broader process that promotes walking, biking, and transit and supports other community goals and values.
- **Support the goals and policies of the City's Climate Neutrality Plan to promote sustainable transportation, limit vehicle miles travelled, and reduce emissions from the transportation sector.**

- Describe a range of specific strategies, actions, programs, and projects to support walking and biking.
- Ensure that exemplary pedestrian and bicycle accommodation is always included in new private development and public capital projects as Flagstaff continues to grow.
- Help build capacity in our transportation system in a way that is cost-effective and enhances community vibrancy.
- Position the City to take advantage of funding and grant opportunities as they become available.
- Identify missing and needed pedestrian and bicycle facilities, establish a process for setting priorities, outline a 20-year program of infrastructure projects, and inform the annual capital planning process.
- Increase community awareness of and engagement in walking and biking issues and opportunities.
- Include a wide range of planning considerations and design guidelines to help enhance the functionality of our transportation network and support active transportation.
- Set measures and targets to assess our progress.
- Establish transportation policies and principles that are carried forward in subsequent plans and policy documents, including updates to the Regional Plan and Regional Transportation Plan, future master and specific plans, and corridor and neighborhood plans.

Specific plans

The ATMP is a Specific Plan as defined and described in in Chapter III of the Regional Plan 2030 and [Division 11-10.30](#) of Flagstaff City Code. The purpose of a Specific Plan is to provide a greater level of detail for a specific element of the Regional Plan, as well as to provide direction and guidance for its implementation.

Specific plans, which are adopted by the City Council by resolution according to the process described in Section [11-10.30.030](#) of Flagstaff City Code, are official City policy.

Like other specific plans, the ATMP has a useful life of about five years, and the document should be comprehensively reassessed and revised every five years at a minimum. Its goals and policies, on the other hand are written broadly and intended to be viable for a 10- to 20-year planning horizon. Even as

circumstances change, the goals and policies of this document should provide consistency in the path forward.

Policy context

Flagstaff already has several adopted plans and other documents that address transportation and provide context for the ATMP, most notably the [Flagstaff Regional Plan 2030](#). A compilation of existing planning documents that reference or are relevant to walking and biking is included in [Working Paper 1: Existing plans, policies, regulations, and guidelines](#).

Flagstaff Regional Plan 2030

The [Flagstaff Regional Plan 2030](#) was adopted by the City Council and ratified by Flagstaff voters in 2014. The Regional Plan is a high-level policy guide that covers a variety of topics regarding the future physical development of Flagstaff. The transportation element of the Regional Plan describes an overall vision for transportation in Flagstaff, as well as goals and policies needed to achieve that vision. These goals and policies are the starting point for the ATMP, which seeks to advance and clarify policy guidance specific to walking and biking.

Callout | Regional Plan vision for transportation

Regional Plan vision for transportation: In 2030, people get around to where they need to be in an efficient and safe manner, and more people ride the bus, their bikes, and walk, reducing emissions and increasing health.

The Regional Plan sets forth several main transportation and land use policy themes that support active transportation:

- Encourages compact, dense infill development that integrates housing, shops, and employment to increase personal mobility and reduce vehicle congestion.
- Uses area types and activity centers to prioritize travel modes and set level of service standards.
- Supports a balanced, integrated multi-modal transportation system.
- Promotes infrastructure and programs to expand travel choices, increase walking, biking, and transit use, and reduce reliance on single occupancy vehicles.

Callout | Regional Plan Goals for pedestrian infrastructure

Goal T.5. Increase the availability and use of pedestrian infrastructure, including FUTS, as a critical element of a safe and livable community.

- Policy T.5.1. Provide accessible pedestrian infrastructure with all public and private street construction and reconstruction projects.

- Policy T.5.2. Improve pedestrian visibility and safety and raise awareness of the benefits of walking.
- Policy T.5.3. Identify specific pedestrian mobility and accessibility challenges and develop a program to build and maintain necessary improvements.
- Policy T.5.4. Design streets with continuous pedestrian infrastructure of sufficient width to provide safe, accessible use and opportunities for shelter.

Callout | Regional Plan Goals for bicycle infrastructure

Goal T.6. Provide for bicycling as a safe and efficient means of transportation and recreation.

- Policy T.6.1. Expand recognition of bicycling as a legitimate and beneficial form of transportation.
- Policy T.6.2. Establish and maintain a comprehensive, consistent, and highly connected system of bikeways and FUTS trails.
- Policy T.6.3. Educate bicyclists and motorists about bicyclist safety through education programs, enforcement, and detailed crash analyses.
- Policy T.6.4. Encourage bikeways and bicycle infrastructure to serve the needs of a full range of bicyclist experience levels.
- Policy T.6.5. Provide short- and long-term bicycle parking where bicyclists want to travel.
- Policy T.6.6. Integrate policies to increase bicycling and meet the needs of bicyclists into all relevant plans, policies, studies, strategies, and regulations.

Planning pyramid

The planning pyramid depicted below illustrates a process that begins with the vision, concepts, and goals of the Flagstaff Regional Plan at the top of the pyramid and culminates with projects and programs to implement those goals and achieve the vision at the bottom. As a specific plan, the ATMP occupies the middle range between the two ends.

- Regional plan. Establishes a vision for the community and outlines a series of goals and policies to realize that vision.
- Specific Plans. Consist of two types; neighborhood plans provide a greater level of detail for a smaller geographic area, while a master plan covers an individual topic like open space or utilities. The ATMP falls into the latter category and provides detailed information and guidance for walking and biking.
- Implementation. Documents and programs that directly support implementation, such as the Zoning Code, Engineering Standards, and Capital Improvements Program.

Sustainability, which is depicted along the left edge of the pyramid, is a common underlying theme across all three levels of documents.



Graphic | planning pyramid

Carbon Neutrality Plan

The Flagstaff Carbon Neutrality Plan (FCNP), which was released as a draft in March of 2021, is **the City's** framework for how to reach carbon neutrality goal by 2030. In Flagstaff, the transportation sector is responsible for 30 percent of greenhouse gas emissions, primarily from passenger vehicle emissions. As a result, achieving the carbon neutrality target established in the declaration will require rapid and extensive changes in our transportation policies and practices.

The FCNP has been developed in response to [Resolution 2020-09](#) – adopted by the City Council in June of 2020 – which declares a climate emergency in Flagstaff and calls for a dramatic shift in our ambition and action to combat climate change. The declaration commits the City to achieving carbon neutrality and replaces the previous [Climate Action and Adaptation Plan](#) goal of an 80 percent reduction in carbon emissions by 2050 with a new goal to reduce emissions by 100 percent by 2030. The revision is in line with the United Nations [Environmental Program's Emissions Gap Report 2019](#), which finds that more aggressive action is needed globally to achieve the 1.5°C target of the Paris Agreement.

Decreasing dependence on cars is one of the core target areas of the FCNP: the draft plan calls for aggressive action to shift away from car-dependent planning and transportation design and to focus more resources on supporting walking, biking, and transit. The draft FCNP also sets a goal for half of all trips to be taken by walking, biking or transit, corresponding to the targets set in the ATMP. This goal will only be reached through a significant transformation of **Flagstaff's** transportation system.

The FCNP references and relies on the ATMP for the details to build a complete active transportation network, encourage walking and biking, and revise policies to prioritize active transportation.

Following adoption of the FCNP by the Council, the City will forward a major amendment to the Regional Plan to update the **City's** goals and policies for climate change based on the recommendations of the FCNP.

Callout | FCNP areas of action and strategies

Area of action: decreased dependence on cars

Strategies:

- DD-1: Transform our transportation and land use systems.
- DD-2: Encourage vibrancy, appropriate density, and attainability in existing neighborhoods, so that more residents live within walking distance of their daily needs.
- DD-3: Create inclusive networks for walking and biking that are continuous, attractive, safe, comprehensive, and convenient for people of all ages.
- DD-4: Encourage Flagstaff residents and visitors to walk, bike, roll, and take the bus.
- DD-5: Transform transportation policies and planning to incorporate greenhouse gas emissions analysis and reduce dependence on driving
- DD-6: Support transit operations
- DD-7: Avoid Congestion Mitigation and Air Quality (CMAQ) non-attainment status.

Key community priorities and objectives

This set of priorities and objectives were created by the City Council in the fall of 2019 in conjunction with **the City's transition to a** priority-based budgeting (PBB) system. They represent an update of previous Council goals, which had been considered and renewed annually. **The Council's** key priorities and objectives will be approved in late 2020, following community engagement and review.

Callout | Key community priorities

Key Community priorities

- High performing governance
- Safe & healthy community
- Inclusive & engaged community
- Sustainable, innovative infrastructure
- Robust resilient economy
- Livable community
- Environmental stewardship

A total of 39 objectives are listed under the seven priorities. Two of these directly address walking and biking:

- Sustainable, innovative infrastructure. Identify smart traffic management, multi-modal transportation, and alternative energy opportunities
- Environmental stewardship. Implement sustainable building practices and alternative energy and transportation options

Additionally, a number of other objectives are supported indirectly through promotion of walking and biking and enhancement of the pedestrian and bicycle environment.

State and federal policies

Flagstaff's policies in support of walking and biking are consistent with existing state and federal policies:

- Federal policy. The US Department of Transportation's Policy Statement on Bicycle and Pedestrian Accommodation **indicates that it is DOT policy to...**

"Incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."

- State policy. **It is the policy of the Arizona State Transportation Board to...**

"Encourage bicycling and walking as viable transportation modes, and actively work toward improving the transportation network so that these modes are accommodated, by promoting increased use of bicycling and walking, and accommodating bicycle and pedestrian needs in the planning of transportation facilities."

[Link | US and state policy documents](#)

Making the case

Active transportation offers a variety of benefits to the community and its residents, and directly supports community goals and objectives beyond transportation and mobility.

Health

- Walking and biking and other physical activity are linked to numerous health benefits.
- Commuting to work and running errands on foot or by bicycle are easy and convenient ways to incorporate physical activity into busy schedules.
- Walking and biking contributes to emotional well-being and happiness

Safety

- Providing facilities for walking and biking can help make roadways safer for all users, including motorists.
- Drivers are more aware and use more caution when pedestrians and bicyclists are present.

Mobility

- More viable transportation options means better mobility for the entire community.
- Walking and biking helps support transit by making it easier for riders to get to transit stops and extending the reach of bus lines into neighborhoods. Transit supports walking and biking by serving as a backup safety net.
- When walking, biking, and transit is prioritized, it is easier, more convenient, less time-consuming, and less expensive to get around; while driving and parking are difficult, time-consuming, and expensive.
- Children who do not have to be driven to school and activities learn to be more independent and experience a greater sense of freedom.
- Better mobility for seniors can help them be more active and social, allows aging in place, and provides better access to health care and social services.

Equity

- Transportation options improve mobility for all segments of the population, including the elderly, individuals with mobility challenges, and low-income populations.
- About a third of Flagstaff residents do not drive at all, including children under 16, elderly residents who no longer drive, disabled persons who are physically unable to drive, people whose driving privileges have been suspended, and people who choose not to drive. For this segment of the population, mobility is dependent on walking, biking, or taking the bus.
- Not everyone can afford to drive. The average vehicle costs \$8,000 to \$12,000 annually to own and operate, and transportation accounts for 20 percent of a typical household income.
- Better and less expensive transportation options help to eliminate a barrier for low-income people to participate in the workforce.

Environment

- Walking and biking reduces reliance on fossil fuels and lowers greenhouse gas emissions, which provides numerous benefits such as improved local air

quality and better health. Walking and biking also support Flagstaff's goal of carbon neutrality. In Flagstaff, transportation accounts for about 30 percent of greenhouse gas emissions.

- Pedestrian and bicycle infrastructure requires less pavement than vehicle infrastructure, reduces the urban heat-island effect, generates less stormwater runoff, and produces less noise and light pollution.

Economy

- Pedestrian and bicycle-friendly commercial areas promote street-level activity, vibrancy, and vitality; which help generate increased revenues.
- Communities with strong walking, biking and trails infrastructure gain a competitive edge in attracting and keeping businesses and jobs. For many private companies, locational decisions are driven as much by quality of life factors as economic considerations.
- Sidewalks, bike lanes, trails and other non-motorized infrastructure are much less expensive to build and maintain than highways, streets, and parking lots.

Community character and quality of life

- Walking and biking are community indicators of quality of life, and the prevalence of walking and biking is a gauge of how well a community is advancing the quality of life for its citizens.
- FUTS trails, sidewalks, and bike lanes provide convenient access to parks, recreation, open space, and the forest – a significant Flagstaff value.
- Walking and biking reduce the amount of paved space needed to accommodate automobile travel in the form of highways, streets, driveways and parking lots.
- More NAU students walking and biking and taking the bus mitigates the impact of student housing projects on the community.
- Places where people are seen walking and biking are perceived as safe and friendly places to live and visit.
- Multi-modal facilities often incorporate civic space that supports public interaction and community engagement.
- Being on foot or on a bicycle provides a slower-paced and more intimate perspective of the city, more opportunity for social interaction and contact with neighbors, and an overall heightened sense of community.

Guiding principles

These guiding principles form the foundation for ATMP, serve as statements of what we believe, and reflect our expectations for walking, biking, mobility, and transportation in Flagstaff.

Walking and biking are important to Flagstaff and significant community values

- Walking, biking, and transit provide a variety of social, economic, health, and environmental benefits for the community.
- Being walkable and bicycle-friendly contributes significantly to Flagstaff's community character.
- Providing sustainable transportation options is critical to meeting the City's climate action goals.

There is a significant opportunity in Flagstaff to expand walking and biking

- Walking and biking as transportation options need to be actively supported, encouraged, and prioritized by the City in order to thrive. Peer communities that are recognized as great places for walking and biking have worked hard to become that way.
- There is a positive community response when the City prioritizes and actively works to accommodate and encourage walking and biking. We do not need to solve all problems, but we should address the most pressing.

More people will choose to walk and bike when it is comfortable, convenient, and appealing

- Many people are discouraged from walking and biking because they feel uncomfortable and unsafe, particularly when facilities are not adequate.
- If you build it, they will come; there is ample evidence from other communities that when active transportation is prioritized, people walk and bike more.
- While good infrastructure is essential, walking and biking requires a comprehensive approach that goes beyond infrastructure and addresses education, encouragement, enforcement, equity, and evaluation.

Walking and biking are critical elements of a robust transportation system

- Our transportation system is most efficient and equitable when it provides a range of transportation options, including walking, biking, and transit.

- Shifting trips to walking and biking is essential to managing congestion and enhancing mobility.
- Walking, biking and transit are mutually supportive; walk- and bicycle-friendliness encourage increased use of transit; and a strong transit system supports walking and biking.
- Streets that safely and comfortably accommodate walking and biking are safer for all road users.

Walking and biking are integral parts of a larger context of land use, community character, and street design

- Streets are our most ubiquitous community space; they serve a variety of community functions in addition to transportation.
- The nature of land use – in particular density, compact form, diversity of uses, and urban design – have an essential influence on walking and biking.
- If we plan for cars and traffic, we will have cars and traffic; if we plan for people and places, we will create places for people.
- Congestion cannot be solved, but it can be managed by enhancing access to and the quality of other transportation options.
- Shifting trips to walking and biking is essential to managing congestion and enhancing mobility.
- **At this point in Flagstaff's evolution as a small city, driving and parking will** not always be convenient, and it may be neither practical nor desirable to try to make it so.
- The design and character of our streets should reflect our community goals and values for community character, climate change, equity, and safety.

Mobility – the ability to travel freely to access our daily needs and activities – is a fundamental human right

- A transportation system based on principles of universal design – usable by all with minimal adaptations – benefits all users.
- Equity is both a process and an outcome; a transportation system that serves all depends on a planning and decision-making process that is equitable and inclusive.
- Community mobility is measured by how well those with mobility challenges can access their daily needs, live independently, and move freely.

- Flagstaff has good mobility when everyone can access opportunities and services, regardless of age, ability, gender, race, income status, location, or situation.

Approach

Making Flagstaff a better place for walking and biking, meeting our climate goals, and creating a more functional transportation system requires a new approach to transportation:

- Be more transformational than incremental. Flagstaff could be a great city for walking and biking, but we need to take bold action to make it happen. **What's** needed is a fundamental shift in our approach to walking and biking accommodation, as well as with transportation planning in general.
- Prioritize pedestrians and bicyclists. Those who walk and bike are deserving of extra consideration, including additional protection as vulnerable roadway users. We should always strive to provide exemplary facilities for walking and biking, not the bare minimum and not as an afterthought.
- Take a well-rounded approach to transportation. Planning for transportation needs to consider multiple community objectives – community character, sustainability, public health, economic vitality, environmental stewardship, and equity – and not just the conveyance of motor vehicles.
- Pursue a wide range of solutions for mobility. Efficient management of transportation resources requires multiple approaches and a broad range of strategies. Focus on enhanced mobility and give people better options. An approach that relies solely on increasing vehicle capacity is expensive and not effective.
- Use Travel Demand Management (TDM) as a guiding principle. A TDM approach helps to enhance options and manage congestion by simultaneously reducing demand for vehicle use and increasing capacity for sustainable modes.
- **Don't overbuild for cars.** Wide, fast roads and large parking lots discourage walking and biking, encourage automobile use, create unsafe streets for all modes, and make it difficult to promote desirable community character. Reliance on traffic models, level of service measures, and vehicle capacity can lead to overbuilding.

2 Current conditions

This section provides an overview of current conditions for walking and biking in Flagstaff, based on several measures and considerations. Taken together, these measures reveal a community that is generally good for walking and biking but has significant room for improvement. While there are many positives, there is also a long list of challenges. Overall there is tremendous opportunity in Flagstaff to be a premier community for walking and biking.

Introduction

Walking

Walking is the most enduring and universal mode of transport. In Flagstaff, walking is the most robust of the active modes; the percentage of trips in Flagstaff made by walking is significantly higher than for bicycling or transit. Additionally, the percentage of Flagstaff residents who walk to work far exceeds state and national averages and places us in the upper echelon of our peer communities.

According to the most recent Trip Diary Survey, one in five respondents (22 percent) made at least one walking trip of at least 600 feet during the 24-hour survey period. In the central part of the City, which includes Downtown, the Southside, and the NAU campus, one-third (33.6 percent) of respondents made at least one walking trip.

Walkability is highly dependent on land use and urban form in addition to complete and comfortable facilities. Because trips are short, walking requires proximity and is supported by density, mixed-use, and compact form. Walkability is also responsive to good urban design; attractive and engaging places are appealing to pedestrians.

Bicycling

Bicycling as a travel mode presents one of Flagstaff's best opportunities for reducing vehicle trips and increasing the share of trips made by active modes.

Bicycles make it possible to travel longer distances, and to carry some cargo as well. **Flagstaff's compact size means that most of Flagstaff is contained within a bikeable area**, so in theory all in-town trips could potentially be converted to bicycle trips. In Flagstaff the average length for all trips is 4.2 miles, and almost 60 percent of trips are less than five miles in length. This distance is eminently bikeable, provided we can make it comfortable for the average person.

Biking is also a **big part of Flagstaff's culture and identity**. **Flagstaff is becoming a** world-class destination for mountain biking, with more than 300 miles of recreational single-track trails in close proximity. Flagstaff also hosts numerous bicycle-themed events throughout the year.

Status of walking and biking

Infrastructure

The terms infrastructure simply refers to the physical facilities for walking and biking. This document generally references five main types of infrastructure: sidewalks, bikeway, FUTS trails, crossings, and bridges and tunnels. This section provides a qualitative and quantitative assessment of current infrastructure conditions

Sidewalks

Sidewalks are a basic facility for walking and a fundamental component of a city-wide pedestrian network. City standards, as well as best practices, dictate that sidewalks should be located along both sides of all streets to accommodate pedestrians.

- Flagstaff has just over 300 miles of sidewalks along public streets.
- Only about half **of Flagstaff's public streets (53 percent) have sidewalks** along both sides of the street, and 29 percent have no sidewalk at all.
- Parkways or furnishing strips are not present on approximately 64 percent of sidewalks.
- Sidewalks are present on 70 percent of our major street network.
- Sidewalks are typically four or five feet in width, which is less than optimal for pedestrians.
- Poor condition (cracks, heaves, crumbling surface) and obstructions (parked cars, trash cans) can limit the functionality of sidewalks. Keeping sidewalks clear of snow and cinders is also a challenge.
- Curb ramps are present at most intersections, although the City does not have a comprehensive inventory to determine where curb ramps are missing and assess their condition.

Bikeways

Bicycle accommodation in Flagstaff has historically consisted of on-street bike lanes on busy streets, as well as a handful of paved FUTS trails, like the Route 66 FUTS, that serve an important commuter function.

- There are 97 miles of designated bike lanes in Flagstaff, and another 34 miles of usable shoulders.
- Bike lanes are present on 71 percent of major streets.
- Several major road segments lack bike lanes altogether, including Milton Rd, Woodlands Village Blvd, and Humphreys St.
- Many other streets are missing bike lanes for short stretches or at specific locations.
- In total there are 70 miles of missing bike lanes on major streets.
- Bike lanes often end before intersections; a total of 61 major intersections are missing bike lanes on one or more of the approaches to the intersection.

Flagstaff Urban Trails System (FUTS)

The Flagstaff Urban Trails System (FUTS) is a citywide network of non-motorized, shared-use pathways for bicyclists, walkers, hikers, runners, and other users for both recreation and transportation. FUTS trails are popular for both commuting and recreation and are an important component of our pedestrian and bicycle infrastructure.

- There are 58 miles of existing FUTS trails in Flagstaff.
- Of the existing trails, about half are paved and half are aggregate surfaced.
- Another 82 miles of trails are planned on the FUTS master plan.
- FUTS are not always ideal as a commuter facility for bicyclists, as they are shared with other users and alignments and crossings can be awkward.
- Trails that are aggregate surfaced are not cleared of snow and can be unusable for portions of the winter.
- FUTS extend throughout the community and give access to most neighborhoods, but there are still significant gaps in the system.

Crossings and intersections

The ability to cross a street is as important to the pedestrian and bicycle network as being able to walk or bike along it.

- Flagstaff has installed flashing beacon crossings at 10 different locations in the past several years.
- There are 21 existing grade-separated crossings in Flagstaff, including 10 bridges or tunnels that are exclusively for the use of pedestrians and bicyclists.
- More than 30 percent of major street intersections do not fully accommodate pedestrian crossings. This includes 34 intersections where pedestrian crossings are prohibited on one or more legs.
- There are numerous street corridors in Flagstaff that are very difficult to cross due to the speed, volume, and width of the street, and few safe and comfortable crossings are provided.
- The presence of two interstates and the railroad through Flagstaff create significant breaks in pedestrian and bicycle networks.

[Map 2.01 | Sidewalk status](#)

[Map 2.02 | Existing and missing sidewalks](#)

[Map 2.03 | Existing and missing bike lanes](#)

[Map 2.04 | Existing FUTS trails](#)

[Map 2.05 | Existing crossings](#)

Mode share

Mode share is the percentage of trips that are taken by different modes of travel, including walking, biking, transit, and private vehicles, and a direct measure of the status and health of walking and biking in a community. **Overall, Flagstaff's** mode share numbers are relatively strong and indicative of a good climate for walking and biking; however flat or declining trends indicate that more work is needed.

More complete information on mode share is provided in Working Paper 3: Mode Share Information and Trends.

Trends

- According to the 2018 Trip Diary Survey, 22 percent of all trips in Flagstaff are made by walking and biking, including 14.3 percent walking and 7.8 percent by bicycle.

[Graphic | Current mode share](#)

- The percentage of trips made by walking has increased somewhat since 2006, while the percentage of bicycle trips has declined, based on composite data from the Trip Diary Survey and the American Community Survey.

Graphic | Mode share trends

Geography

- In the core area of Flagstaff, which includes Downtown, the Southside neighborhood, and the NAU campus, people are much more likely to walk or bike than in the rest of Flagstaff. The combined walk and bike mode share is 44.2 percent in the core area, but only 12.7 percent for the rest of Flagstaff.
- Mode share trends vary drastically by geography; between 2006 and 2018 walking and biking mode share increased by 14.8 percent in the core area of Flagstaff but decreased by 7.2 percent in the rest of Flagstaff.

Populations

- Women are significantly more likely to walk to work than men (17.5 percent versus 7.1 percent), but less likely to ride a bicycle (2.7 versus 4.3 percent).
- Almost 30 percent of the work force who are below the poverty threshold walk, bike or take transit to work, compared to only 11.3 percent of those above the poverty line.
- People who identify as having a disability are significantly more likely to walk or take transit to get to work compared to those without a disability (17.1 percent versus 11.0 percent), but significantly less likely to commute by bike (0.6 percent versus 1.9 percent).

Peer cities

- In comparison to our peer communities - cities in the west with a similar population to Flagstaff and a large public university – we are among the leaders in walk share to work (third of 20 cities). Our walk share of 11.5 percent is well above the average of 7.9 percent.
- Flagstaff lags behind our peer communities in bicycle mode share to work (12th of 20 cities), and our bike share of 3.6 percent is below the average of 5.1 percent.
- Flagstaff is well ahead of other Arizona communities in walk share to work; our walk share of 11.5 percent is well ahead of Prescott, the next highest city at 4.4 percent. However, our bike to work share of 3.6 percent places us second behind Tempe at 3.7 percent.

Safety

Review of pedestrian and bicycle crash data provides our best indicator of safety for active transportation. However, we do not have comparable data for our peer cities, so it is difficult to make comparisons. We also lack information on number

of pedestrians and bicyclists, so we cannot determine exposure or rates. We do have data available for several years, so it is possible to see if the number of crashes is increasing or decreasing.

Working Paper 4: Pedestrian and Bicycle Crash Data includes a complete analysis of crashes involving pedestrians and bicyclists in the 10 years between 2009 and 2018.

Trends

- Flagstaff has an average of 29 crashes involving pedestrians each year. Pedestrian crashes represent 1.6 percent of all crashes in Flagstaff.
- There is an average 52 crashes involving bicycles and motor vehicles each year in Flagstaff. Bicycle crashes represent 2.9 percent of all crashes in Flagstaff.
- Annual numbers for both pedestrian and bicycle crashes in Flagstaff have generally trended downward since 2001.

Injuries and fatalities

- More than a quarter (26.4 percent) of all pedestrian crashes in Flagstaff result in serious injury or death to the pedestrian.
- Pedestrian fatalities represent almost half of all traffic fatalities in Flagstaff. Since 2009, Flagstaff has averaged just under three pedestrian fatalities per year.
- Fewer than six crashes per year on average in Flagstaff result in serious injury to the bicyclist.
- Flagstaff did not see a fatal bicycle crash between 2013 and 2020. In the four years from 2009 to 2012 there was one fatal bicycle crash per year.

Locations

- Street segments that see the highest numbers of pedestrian crashes include Milton Road, Fourth Street, Butler Avenue, and San Francisco Street.
- High pedestrian crash intersections include Milton Rd/Riordan Rd, University Dr/Knoles Dr, and Route 66/San Francisco St.
- High bicycle crash street segments include Milton Rd, Route 66, and Butler Ave.
- Intersections with the most bicycle crashes include Route 66/Humphreys St, Butler Ave/San Francisco St, Milton Rd/Butler Ave, and Milton Rd/Malpais Ln.

Other crash facts

- Nearly half of bicyclists involved in crashes are between 18 and 24 years of age.
- Men are significantly over-represented in pedestrian and bicycle crashes; more than two-thirds of pedestrians and almost three-quarters of bicyclists in crashes are male.
- A disproportionate number of pedestrian crashes – two in five – occur at night or in darkness.
- More than half of pedestrian and bicycle crashes are within or related to intersections.
- About two-thirds of pedestrians are crossing the road when they are struck by motor vehicles.
- A substantial percentage (40 percent) of drivers in bicycle crashes are making a right turn.

[Map 2.06 | Pedestrian crashes](#)

[Map 2.07 | Bicycle crashes](#)

National measures

National measures and recognition programs can be somewhat general and oversimplify conditions, but they afford an opportunity for comparison to other communities. They also offer an outside, third-party perspective of Flagstaff. Two national measures are referenced here.

Walk and Bike Score

Walk Score and Bike Score (walkscore.com) are online services that measure the walkability or bicycle friendliness of a community, neighborhood, or individual location. Scores are available for Flagstaff as well as many of our peer communities.

- Walk score. **Flagstaff's Walk Score of 38 places it in the "Car Dependent" category** and is an indication that most errands require a car. Our Walk Score places us at the lower end of our peer communities; 14th out of our 20 peer cities, and below the average score of 43.
- Bike score. **Flagstaff's Bike Score of 65 places it in the "Bikeable" category** and indicates that some bicycle infrastructure is present. Our Bike Score places us 8th out of 20 peer cities, and just above the average score of 61.

Walk and Bicycle Friendly Communities

- **Walk Friendly Communities.** The Walk Friendly Communities program (walkfriendly.org/) was started in 2010 to recognize communities that are working to improve a wide range of conditions related to walking, including safety, mobility, access, and comfort.

Flagstaff was designated as a Walk Friendly Community at the bronze level in 2011, one of 11 communities recognized nationally in the inaugural round of the program. We are the only community in Arizona, and one of 76 cities across the country to be designated.

- **Bicycle Friendly Communities.** This program of the League of American Bicyclists (bikeleague.org/bfa) helps communities improve conditions for bicycling via bicycle friendly metrics and assessment tools.

Flagstaff was designated a Bicycle Friendly Community (in 2006 at the bronze level and promoted to silver in 2010. There are 488 bicycle friendly communities across the country and 13 in Arizona.

Comfort indices

Comfort indices are measures of how comfortable or difficult it is to walk or bicycle on a street, using a variety of factors that influence pedestrian and bicycle comfort. Four different comfort indices have been developed for Flagstaff:

- Pedestrian
- Bicycle
- Intersection
- Crossing

Because these indices consider a variety of characteristics of the street, they provide a more comprehensive measure of pedestrian and bicycle accommodation than just whether a street has bike lanes or sidewalks.

Call out | Comfort indices factors...

Pedestrian Comfort Index (PCI)

- Speed of traffic
- Volume of traffic
- Number of lanes
- Presence of median
- Functional class of street
- Sidewalk presence
- Sidewalk width
- Parkway presence

- Street buffer
- Land use density-diversity-design

Bicycle Comfort Index (BCI)

- Speed of traffic
- Volume of traffic
- Number of lanes
- Presence of median
- Functional class of street
- Bike lane presence
- Bike lane width
- Side friction (side streets and driveways)
- Heavy vehicle volume
- Land use density-diversity-design

Intersection Comfort Index (ICI)

- Speed of traffic
- Volume of traffic
- Number of lanes
- Traffic control
- Intersection geometry
- Sidewalk presence
- Curb ramp configuration
- Bike lane presence
- Crosswalk type
- Crossing limitations
- Land use density-diversity-design

Crossing Comfort Index (CCI)

- Speed of traffic
- Volume of traffic
- Number of lanes
- Presence of median
- Functional class of street

The indices also reveal gaps in networks where conditions would not be comfortable for the average pedestrian or bicyclist. For example, for someone who is not comfortable riding in traffic or on busy streets, their network would be limited to the streets that are generally comfortable for cycling. This eliminates many streets and leaves a disjointed, incomplete network.

More detailed information about comfort indices is included in Working Paper X Comfort Indices.

Map 2.08 | Pedestrian comfort index
Map 2.09 | Bicycle comfort index
Map 2.10 | Intersection comfort index
Map 2.11 | Crossing comfort index

Community feedback

Beginning in 2014, a significant effort has been made to engage the Flagstaff community to hear their thoughts about walking and biking in support of the ATMP. Public engagement efforts to date have included:

- Public surveys. Eight community surveys on the Flagstaff Community Forum about walking and biking have collectively garnered more than 2200 responses
- Open houses. Two community open houses – Walking Biking Trails Summits – in November of 2017
- Community events. A presence at numerous community events, and one-on-one discussions with hundreds of community members
- Prop 419 events. Five open houses held in conjunction with Proposition 419, continuation of the transportation sales tax in advance of the election in
- PAC and BAC. Monthly discussions since 2014 at the **City's Pedestrian Advisory Committee** and Bicycle Advisory Committee meetings.

A more complete summary of public engagement efforts for this master plan is found in the [Process and Public Engagement Plan](#). Additional community engagement, including virtual open houses and community surveys, are planned to solicit feedback on this draft document prior to formal adoption.

Through the course of public engagement, several consistent themes emerged:

- Missing facilities. Missing sidewalks and bike lanes, and gaps in pedestrian and bicycle network, are among the most significant issues with walking and biking in Flagstaff
- FUTS trails. FUTS are frequently cited as important components of both pedestrian and bicycle infrastructure
- Traffic. Traffic and driver behavior are problems for both pedestrians and bicyclists
- Maintenance. Maintenance and clearing of sidewalks and bike lanes are a problem

- Crossings. Getting across streets is an issue for pedestrians; specifically too few or no crossings in needed locations
- Protected bike lanes. Bicyclists desire facilities that provide more separation or protection from vehicle traffic
- Milton Road. Milton Road was overwhelmingly identified as the most difficult and least comfortable place to walk and bicycle
- Community support. There is significant community support for walking and bicycle infrastructure

Challenges

From the information presented above, it is possible to summarize the challenges for walking and bicycling in Flagstaff:

- Streets that are difficult or uncomfortable for walking and biking. On many arterial and collector streets, the speed, volume and lanes of traffic, in combination with inadequate facilities for walking and biking, discourage pedestrian and bicycle use. Obvious examples include major streets like Milton Road and Route 66, but other streets like Butler Avenue, Woodlands Village Boulevard, Cedar Avenue, Lone Tree Road, and Fourth Street are also problematic.
- Barriers dividing the community. Linear features, including the BNSF tracks, both interstates, and busy streets, are barriers that make pedestrian and bicycle travel more challenging. There are very few dedicated crossings for pedestrians and bicyclists on the railroad tracks and interstates, and few formal crossings on many streets.
- Challenging and difficult intersections. A number of intersections are characterized by multiple turn lanes, long crossing distances, high-speed turning movements, little awareness or yielding on the part of drivers, less than adequate accommodation, and generally unpleasant conditions for walking and biking.
- Isolated neighborhoods. **Flagstaff's geography has created a number of** locations with limited ways to get to or from them. Often the corridors of access to the neighborhood are busy streets with less than ideal facilities for walking and biking. Some examples:
 - The northeastern neighborhoods of Smokerise and Christmas Tree are isolated from the rest of Flagstaff.

- The Country Club area to the southeast is connected by three main corridors – Country Club Drive, Fourth Street, and Butler Avenue – none have exemplary facilities for walking and biking.
- Neighborhoods south of I-40, including University Heights, Ponderosa Trails, and Bow & Arrow, are cut off by the interstate and must use either Beulah Boulevard or Lone Tree Road to travel north.
- Neighborhoods to the west of downtown along Route 66 have few alternatives for walking and biking other than West Route 66, which has no sidewalks and inconsistent shoulders.
- The BNSF tracks create a barrier for pedestrians and bicyclists commuting to Downtown from the south; track crossings are limited to Milton Road, Beaver Street, and San Francisco Street.
- Limited track crossings in the central area also make north-south travel challenging through Downtown and Southside.
- Milton Road remains a significant obstacle for walking and biking, both along and crossing the street. The NAU campus provides alternate routes to the east, but there are few viable options to the west.
- Commuter bicycle routes to outlying communities are limited to interstates and highways.
- Gaps and inconsistencies in the bicycle network. Although bike lanes are included along many arterial and collector streets, there are still significant missing segments to discourage bicycle use, and bike lanes disappear at many intersections. While many communities have embraced protected bike lanes to appeal to a wider audience, Flagstaff has yet to implement. In general, **Flagstaff's** bicycle network lacks overall cohesion.
- Maintenance challenges. Maintenance of pedestrian and bicycle facilities remains a concern, especially in winter months. The City plows snow into bike lanes rather than clearing them, the use of cinders in winter months creates challenges on both sidewalks and lanes. Frequent freeze-thaw cycles are especially destructive to sidewalks, bike lanes, FUTS trails.
- Pedestrian and bicycle accommodation during closures. Pedestrian and bicycle accommodation is poor during closure of sidewalks, bike lanes, and FUTS trails due to construction, repairs, or utility work. Facilities appear to be closed unnecessarily at times, and there is often little or no consideration of pedestrian and bicycle needs during the closure. Public notification is sparse and inconsistent.
- Few initiatives for education, enforcement, and encouragement. Communities with robust pedestrian and bicycle environments typically

support walking and biking with a variety of programs that go beyond infrastructure and facilities. In comparison to its peers, Flagstaff has few formal programs for education, enforcement, or encouragement.

The opportunity in Flagstaff

While there are significant challenges, Flagstaff is also uniquely positioned to become a great community for walking and biking, for several reasons:

- **Healthy mode share.** Flagstaff already has a lot of people who are biking and walking: 22 percent of trips in Flagstaff are made by walking or biking.
- **Good basic facilities.** Sidewalks and bike lanes are about 70 percent complete, which means we only need to focus on a few priority locations.
- **Compact and dense urban form.** Flagstaff is a compact city and becoming denser. The Downtown, Southside, and NAU campus form a dense core where there is already substantial walking and biking. The remainder of the City is compact enough to allow travel on foot or by bicycle.
- **Short trips.** Many trips made in Flagstaff are short and can potentially be converted from driving to walking or biking. For private vehicle trips, a total of 37 percent are less than 2.5 miles in length, and 11 percent are less than a mile. By comparison, 80 percent of bicycle trips are less than 2.5 miles, and 53 percent of walking trips are less than a mile.
- **Large university.** Northern Arizona University has 20,000 students on campus who are more generally predisposed to walking and biking for daily travel. The NAU campus is located in the central core of the city, and is becoming denser as the university grows.
- **20 years of funding.** Flagstaff has 20 years of funding for pedestrian and bicycle projects via the 2020 transportation sales tax. This tax, which was approved by Flagstaff voters in 2018, will be the primary funding source for implementation of the infrastructure recommendations in this plan. Tax funding can also be used to leverage partnerships and other sources to build more bike and pedestrian infrastructure.
- **Robust transit system.** Flagstaff has a robust transit system. In 2019, more than 2.5 million trips were taken on Mountain Line transit, representing an increase of 250 percent since 2006. Walking and biking support transit since every transit trip starts with one of these modes, and transit supports walking and biking by providing a backup option and allowing longer trips.
- **Active and engaged population.** Flagstaff is an active, healthy, civically engaged community that supports walking and biking, values outdoor

activity and access to open space, and supports sustainability and the environment.

- **Community support.** Surveys of Flagstaff residents consistently show broad support for walking, biking, and trails, a willingness to tax themselves to fund sustainable transportation, and a strong interest in making Flagstaff more walkable and bikeable.
- **Flagstaff Urban Trails System.** The FUTS is one of our most important and well-used facilities for walking and biking. FUTS includes 57 miles of shared use pathways that connect throughout the community, provide a safe and comfortable place for users away from traffic, and encourage both transportation and recreational use.
- **Climate action and sustainability goals.** In November of 2018 the Flagstaff City Council adopted the Climate Action and Adaptation Plan, which establishes meaningful climate action as a core community goal. In June of 2020, the City Council declared a climate emergency and called for a dramatic response to mitigate climate change, including a major shift in our approach to transportation. In April of 2021, the City released the draft Carbon Neutrality Plan, which sets a target for 50 percent of all trips to be made by walking, biking, or transit. Because transportation is a significant contributor to greenhouse gas emissions, promoting sustainable **transportation options is critical for meeting the City's** climate targets.
- **Favorable weather.** Although Flagstaff sometimes see heavy snowfalls, most winter days are still clear and sunny, and snow tends to melt quickly. As a result, walking and biking are still viable transportation options through the winter. Spring, summer, and fall are often ideal for walking, biking, using trails, and being outdoors.

3 Vision, goals, policies, and strategies

This chapter, and the two that follow, describe a progression for the ATMP from thought (vision and goals) through action (policies and strategies) to results (outcomes, measure, and targets). In simple terms, these chapters cover what we want, how we achieve it, and what it looks like at the end. The progression also tracks from high-level and broad to detailed and specific.

Terms used in the next three chapters can be defined as follows, with the descriptions for goals and policies taken directly from the Regional Plan:

- Vision. An aspirational statement of what we want walking and biking to be
- Goal. A desired result a community envisions and commits to achieve
- Policy. A deliberate course of action to guide decisions and achieve stated goals
- Strategies. Suggested ideas of how to specifically implement policies
- Outcomes. The results or consequences of this plan
- Measures. Indicators that tell us if we have achieved the outcomes
- Targets. Specific measures to attain by a certain date
- Considerations...
- Guidelines...

Vision

Flagstaff supports and celebrates walking and biking for everyone, regardless of age, ability, circumstances, or geography

Goals

As established in this plan, it is the goal of the City of Flagstaff to...

- Create an inclusive multimodal transportation system that provides access, mobility, and efficient transportation options for people of all ages and ability.
- Recognize that people who travel on foot, by bicycle, or by transit are legitimate users of the transportation system and deserving of the same considerations as motorized users.
- Make vulnerable road users, pedestrians and bicyclists, the first focus for safety and accommodation in planning for our streets and transportation systems.
- Provide an exemplary level of accommodation for pedestrians and bicyclists in transportation planning, design, operations, and maintenance.
- Promote equity by actively working to ensure that all segments of the population have equal access to safe and functional transportation and equal opportunity for mobility, regardless of age, ability, gender, race, income status, location, or situation.
- **Maintain Flagstaff's streets, sidewalks, bikeways, crossings, and FUTS trails in good condition and free of snow, debris, and blockages to ensure safety and functionality for all users, regardless of transportation mode.**
- Provide a range of functional and attractive transportation options so that all residents and visitors have choices in how they move around the city.
- Integrate transportation and land use planning such that development decisions support transportation goals, and transportation planning **advances the community's vision for the built environment.**
- Build networks for walking and biking that are continuous, attractive, safe, comprehensive, and convenient.
- Provide crossings where they are desired and useful, and avoid building streets that function as barriers, in recognition of the essential need of pedestrians and bicyclists to cross streets.
- Design and build transportation infrastructure that is appropriate for the context of the corridor, neighborhood, or district where it is located.
- Reduce the demand for single-occupancy vehicle use and increase options for walking, biking, and transit as a fundamental approach to transportation planning.
- Make transportation decisions based on all impacts of transportation to the community – including community character, sustainability, public health,

economic vitality, environmental stewardship, equity, and safety – and not just vehicular capacity and traffic flow.

Policies and strategies

1 Infrastructure

- 1.1 Implement networks for walking and biking that are continuous, attractive, safe, comprehensive, and convenient
 - Complete missing sidewalks along major streets and develop a complete pedestrian network.
 - Implement a city-wide network of low-stress bikeways.
 - Expand and enhance the network of FUTS trails.
- 1.2 Provide frequent and comfortable crossings to eliminate barriers and avoid breaks in pedestrian and bicycle networks
 - Develop policies, guidelines, and design guidance for at-grade crossings to ensure that pedestrians and cyclists have safe and convenient crossing opportunities.
 - Revise the warrants review process for crosswalks and enhanced crossings to support pedestrian safety and functionality.
 - Work with ADOT to identify locations for crossings on state-managed streets within Flagstaff and develop a plan for appropriate facilities.
 - Review intersections where pedestrian crossings are prohibited on one or more legs for opportunities to remove the prohibitions.
- 1.3 Ensure the availability of functional bike parking
 - Maintain an inventory of existing bicycle parking, and conduct an analysis based on the inventory to identify where additional bike parking is needed.
 - Lower applicability thresholds in the Zoning Code to require bike parking whenever the use of an existing building changes, a building is occupied after sitting vacant, or a parking lot is reconfigured.
 - Develop standards and requirements in the Zoning Code for long term bike parking for employment areas, multi-family residential development, and student housing.

- Consider incentives for new development to provide enhanced bicycle parking, including covered parking, bike lockers, parking enclosures, and indoor parking.
 - Explore options for temporary or valet bike parking for events and festivals, and work with event organizers to include bike parking and other incentives for active transportation.
 - Implement a City program to provide low-cost or no-cost bike racks to private locations and facilities where bike parking is needed
 - Review current requirements for bike parking to ensure that an adequate number of spaces is provided.
 - Audit development review processes to help developers meet bicycle parking requirements and standards.
 - Find locations for bike parking clusters in Downtown, the Southside, and other major activity centers, including replacement of on-street parking spaces with bike parking.
- 1.4 Incorporate wayfinding signing to enhance the functionality of walking and biking networks
- Establish standards and guidelines for signing that is coordinated across pedestrian, bicycle, and FUTS networks.
 - Develop and implement a comprehensive system wayfinding and signing as an integral part of the bikeway network.
 - Install additional wayfinding signs for the FUTS system, including additional map kiosks at key locations.
 - Provide destination and wayfinding signs along key pedestrian networks.
- 1.5 Work with our transportation partners to unify walking and biking networks
- Integrate walking and biking connections with the transit network.
 - Coordinate with Northern Arizona University to complete the pedestrian and bicycle network to and through the NAU campus, including new or enhanced points of non-motorized access between the community and campus.

- Participate in the planning processes of other road-managing agencies, and include them as stakeholders in City plans, to support coordination across jurisdictions.
- 1.6 Connect walking and biking facilities with regional trails and open space to ensure convenient access from all Flagstaff neighborhoods
- Include a system of greenways **with FUTS...**
 - Collaborate with the Flagstaff Trails Initiative and other trail managing agencies on regional trails planning and implementation.
 - Implement a plan for non-motorized points of access between Flagstaff neighborhoods and the national forest and regional open space.
 - Plan for direct connections and integration between pedestrian, bicycle, and FUTS networks and regional trails and natural areas.
 - Identify potential locations for trail hubs as major points of connectivity between regional trails and the FUTS system.
 - Work with Coconino County and the Forest Service to plan for non-motorized commuter access from outlying communities to Flagstaff.
- 1.7 Identify and take advantage of opportunities to fund and implement the pedestrian and bicycle network
- Develop five and 20-year plans for construction of pedestrian and **bicycle projects for inclusion in the City's capital improvements** program.
 - Ensure that pedestrian and bicycle projects are included in other projects, including street projects, private development, and capital projects.
 - Develop standards that require adequate pedestrian and bicycle facilities in new private construction and redevelopment.
 - Find opportunities to bundle pedestrian and bicycle facilities with partner projects.
 - Monitor grant opportunities that could be used for pedestrian and bicycle projects.

2 Maintenance and operations

- 2.1 Maintain walking and biking infrastructure in a state of good repair

- Keep up-to-date inventories of facilities and condition, and establish priorities for maintenance so the most important facilities and concerns are addressed first.
- Ensure that maintenance budgets are adequate to keep facilities in good condition.
- Conduct a review of peers and other communities for ideas, programs, and best practices for maintenance.
- Develop standards and guidelines for sustainable facilities to reduce the need for and costs of maintenance.
- Establish a regular maintenance schedule and program for walking and biking facilities, based on minimum standards or targets for condition.
- Review current maintenance practices to find efficiencies and implement best practices.

2.2 Clear ice and snow from pedestrian and bicycle facilities to keep them usable through the winter months

- Adopt snow clearing policies and practices for bike lanes, sidewalks, and FUTS trails.
- Establish a hierarchy of routes for sidewalks, bikeways, and FUTS trails to help prioritize snow clearing.
- Provide detailed information, schedules, and maps for snow clearing so the public knows what to expect during snow events.
- Conduct a review of our peers and other communities for ideas, programs, and best practices for snow clearing.
- Consider a range of options for compliance and enforcement of private snow removal on sidewalks.
- Include considerations for snow clearing and snow storage in the design and construction of facilities.

2.3 Keep walking and biking facilities free of blockages and debris

- Provide and promotes convenient ways for the public to report obstructions and other problems to City Code Compliance.

- Work with the Police Department on reporting and enforcement of parked vehicles on sidewalks, bike lanes, and FUTS trails.
- Review street sweeping schedule and practices for efficiencies and effectiveness, particularly in the winter and spring to keep sidewalks and bike lanes clear of cinders.
- Expand public education and outreach regarding the importance of keeping sidewalks and bike lanes clear.
- Consider expanding the **Citizen Tracker function on the City's website** to include support for mapping and reporting from mobile devices.
- Support volunteer and neighborhood efforts that could be expanded to include sidewalk sweeping and vegetation removal.
- Expand public outreach and education to increase awareness and encourage good behavior.

2.4 Limit the impact of closures on walking and biking facilities

- Implement a formal review and permitting process for all closures of sidewalks, bike lanes, and FUTS trails.
- Develop guidelines and standards for closures, to ensure that closures are minimized, and that pedestrians and bicyclists are accommodated when closures occur.
- Establish procedures for consistent and systematic notification of closures to the community.

2.5 Improve and enhance existing facilities to meet basic levels of functionality and accessibility

- Create an inventory of deficiencies and potential enhancements and prioritize those that are most needed; consider capital budgets as a potential source of funding.
- Take advantage of opportunities to fix or enhance deficiencies as part of private development and capital projects.
- Develop an inventory of enhancements that support accessibility and universal design.

3 Support and encouragement

3.1 Use information and maps to promote, encourage, and make it easier to walk and bike

- **Update the City's web page to include useful and current information** on walking and biking.
- Use MoveMeFLG as a central clearing house for information and current conditions.
- Create a dedicated social media presence for active transportation that regularly communicates with the public.
- Continue publication of the Flagstaff Urban Trails and Bikeways Map, in both printed and digital form.
- Explore the use of online maps with interactive route planning functionality, to help users find the best way to walk or bike to their destination.
- Provide private map services with current and accurate walking and biking information, including Open Street Map, Google maps, and Apple maps.
- Create walking maps for downtown, southside, and other neighborhoods, or for specific themes like public art, historic sites, or bird watching, to encourage residents and visitors to explore the community.
- Integrate travel information across a variety of modes – walking, biking, transit, bikeshare, micro-mobility, ride hailing services, car share, vanpools, paratransit – to support flexibility and options for mobility.

3.2 Promote events and activities that support walking and biking

- Promote Bike to Work Week and Flagstaff Walks! as signature Flagstaff events for walking and biking.
- Work with community partners to organize additional walking and biking events, such as theme walks, community bike rides, or group hikes.
- Create a walking calendar as a centralized listing of all the organized walking events around Flagstaff
- Organize cyclovias, open street, and slow street events in Flagstaff

3.3 Work towards equity and inclusion in pedestrian and bicycle programs

- Conduct equity analyses of infrastructure plans to ensure equitable distribution of facilities and to verify that low income and underserved neighborhoods are covered.
- Develop working relationships with community and neighborhood groups to enable better access to projects and planning processes.
- Establish formal equity guidelines and practices to foster better inclusion in our planning processes.
- Engage with relevant boards and commission, including the Diversity Awareness Commission, Commission on Inclusion and Adaptive Living, and Coordinated Mobility Council.
- Recruit women, people of color, and other under-represented groups for the Pedestrian Advisory Committee, Bicycle Advisory Committee, and Transportation Commission.

3.4 Incorporate universal access as a key component of walking and biking

- **Review the City's practices and standards for walking and biking** facilities to verify that they are compliant with best practices for accessibility.
- Incorporate principles of Universal Design to create facilities that are usable by everyone regardless of age, ability, or status.
- Prepare and adopt an ADA transition plan.
- Improve accessibility of FUTS trails for all users, and provide better information to the public about accessibility and trail conditions.
- Produce a city-wide inventory of curb ramps to determine where they are missing or substandard.

3.5 Pursue other programs and facilities that are supportive of walking and biking

- Implement a city-wide bike share program.
- Work with local groups to establish a Flagstaff community bicycle collective.
- Explore space and programming for bike stations and mobility hubs in future public projects, including the Downtown Connection Center, parking garages, and other public facilities

- Support the use of e-bikes and other micromobility devices to enhance mobility options for more of the community.

3.6 Develop beneficial relationships with our community partners to promote walking and biking

- **Coordinate with the Convention and Visitor's Bureau** to produce good information on walking, biking, and trails to share with visitors.
- **Work with the City's business retention and attraction function** to promote walking, biking, and trails as community assets for business retention and attraction.
- Coordinate efforts to promote walking and biking with Northern Arizona University.
- Stay engaged with a broad range of stakeholder groups and individuals, including advocacy groups, public health professionals, neighborhood associations, healthcare providers, wellness coordinators, bike and outdoor shops.
- Support and encourage local advocacy groups for walking and biking.

4 Safety

4.1 Establish comprehensive education and safety programs for pedestrians, bicyclists, and motorists

- Organize an on-going schedule of safety and education classes.
- Recruit community members to become League Certified Instructors (LCI) for bicycle safety, including individuals from the Police Department, NAU, and the PAC, BAC, and Transportation Commission.
- Expand the Bicycle Diversionary Class program to provide an education alternative for bicyclists who receive traffic citations.
- Use on-going safety campaigns to disseminate pedestrian and bicycle safety information.
- Explore options to help educate motorists on safe and courteous driving practices around pedestrians and bicyclists.

4.2 Conduct walking and bicycling safety reviews

- Establish a multi-agency regional safety panel which meets regularly to share and review safety information and includes representatives

from law enforcement, transportation planning, engineering, and public works.

- Conduct roadway safety audits or assessments at locations identified as having high volumes or rates of crashes.
- Conduct before-and-after counts and crash data for major transportation projects to assess their impact and better understand the factors that affect pedestrian and bicycle crashes.

4.3 Re-establish a community-wide Safe Routes to School program

- Team with the Coconino County Injury Prevention program to identify on-going sources of funding for a SRTS coordinator and program.
- Develop a toolkit of options for schools to address drop-off and pick-up traffic that focuses on walking, biking, transit, school buses, car-pooling, and other programmatic solutions, rather than relying on more extensive vehicle infrastructure.
- **Modify the traffic impact analysis process for schools in the City's** development review process to encourage programmatic solutions for school congestion.
- Engage school bicycle and mountain bike clubs to promote education and encouragement.

4.4 Work with the Police Department to advance enforcement efforts that improve safety for pedestrians and bicyclists

- Re-establish a bike patrol within the Police Department.
- Conduct regular targeted enforcement efforts; work with the Police Department to identify the most serious and impactful offenses to target, and include an educational component to maximize the effectiveness.
- Hold in-service pedestrian and bicycle training for officers to ensure they are well-versed in pedestrian and bicycle laws and safe behaviors.
- Recruit Police Department officers as potential LCI candidates and instructors for bicycle safety classes.
- Adopt ordinances and laws that protect and support walkers and bicyclists.

4.5 Make sure our walking and biking facilities allow and encourage safe behavior for all users

- Discourage bicycling on sidewalks through better infrastructure and education.
- Promote user courtesy on FUTS trails via public outreach and education.
- Address perceived safety concerns along FUTS trails with better design and information.
- Encourage bicycle helmet use through education and enforcement.
- Work with law enforcement to reduce the incidence of bike theft through convenient bicycle registration and better bicycle parking and storage.

5 Transportation and land use planning

5.1 Use travel demand management (TDM) as a guiding principle for transportation and land use planning

- Develop a plan for TDM that includes a broad list of potential strategies and an assessment of how they might be implemented
- Promote the MoveMeFLG platform as a single source for information and support for walking, biking, transit, and other sustainable travel options
- Work with Mountain Line, NAU, DBA, and other community partners to develop and implement TDM strategies
- Establish a system that allows a developer to choose from a menu of TND strategies to offset or mitigate traffic impacts, as an alternative to building road capacity projects.
- Require development to pay its fair share for off-site pedestrian and bicycle facilities identified in the ATMP as well as for other facilities for which the development creates a need.

5.2 Establish a complete transportation process for all transportation plans and projects that incorporates broad community objectives for community character, sustainability, public health, economic vitality, environmental stewardship, and equity

- Expand considerations for traffic impact analysis (TIA) and traffic modeling to better address walking, biking, and transit.

- Follow principles of context-sensitive solutions and complete transportation in all transportation plans and projects.
- Adopt and implement a complete streets policy.

5.3 Design and build streets that are safe, comfortable, and functional for pedestrians and bicyclists

- Establish design standards and guidelines for streets and intersections that emphasize safety and comfort of all users over the speed and flow of vehicles
- Incorporate principles of traffic calming and speed management into all street projects.
- Consider pedestrian and bicyclist crossings in the design of all street projects, and accommodate frequent and comfortable crossings.
- Expand neighborhood traffic calming projects at appropriate locations city-wide, and require traffic calming elements in all new neighborhood streets.

5.4 Incorporate principles of placemaking in street design and pedestrian and bicycle infrastructure

- Incorporate public art and decorative design elements in all transportation facilities.
- Integrate Great Streets principles in all pedestrian, bicycle, street, intersection, and corridor projects and plans.
- Protect and celebrate cultural, historical, and natural resources where they exist along walking and bicycling networks.
- Find locations for benches, seating areas, civic spaces, gathering areas along walking and biking networks.

5.5 Adopt design guidelines that reflect best practices for pedestrian and bicycle infrastructure

- Develop detailed design guidelines for walking and biking facilities based on best practices, innovative facilities, and reference guides from AASHTO, PROWAG, and the NACTO
- Revise the Zoning Code and Engineering Standards to incorporate new standards where appropriate.

- Provide training and education on best practices for pedestrian and bicycle facilities for staff, design professionals, policy makers and the community.

6 Evaluation

6.1 Collect and analyze data in support of walking and biking

- Establish a regular program of pedestrian and bicycle counts, including counts on FUTS trails
- Explore other sources for information on walking and biking patterns, including acquisition of third-party data.
- Collect, analyze, and share pedestrian and bicycle crash data.
- Collect and analyze mode share data to assess the health of walking and biking.

6.2 Provide opportunities for community engagement and feedback

- Keep the City Council, commissions and committees informed and actively engaged in walking, biking, and trail issues
- Conduct regular, periodic surveys on walking and biking through the Flagstaff Community Forum, including annual user surveys for walking, biking, and FUTS.
- Facilitate convenient methods for public reporting of walking and bicycling concerns.

6.3 Conduct regular assessments of walking and biking conditions

- Use pedestrian, bicycle, intersection, and crossing comfort indices to help assess the pedestrian and bicycle environment.
- Seek and publicize national recognition for Flagstaff as a walkable and bikeable community.
- Use feedback from national programs like the Walk Friendly Community and Bicycle Friendly Community programs to better understand where improvement is needed.
- Conduct regular neighborhood walking, biking, and accessibility audits as a community-based tool for evaluation and education.
- Conduct an annual review to assess the progress made on implementation of this Active Transportation Master Plan; and report

out on the results to the public, stakeholders, commissions and committees, and the City Council.

4 Outcomes, measures and targets

This section describes the desired results of this plan, as well as measures and indicators to determine if we are achieving those results.

- Outcomes describe the conditions we want to see happen as a result of this plan. They are where we want to go, what we want walking and biking to be, and how we want Flagstaff to look. If the policies and strategies in this plan are the journey, then outcomes are the destination.
- Measures are the indicators that tell us if we are heading in the right direction to reach our desired outcomes.
- Targets allow us to assess progress along the way, give the City a goal to work towards, and indicate if we have achieved our outcomes.

Outcomes and measures

Walking and biking are frequently used transportation options for everyone

- Mode share for walking and biking trips per the MetroPlan Trip Diary Survey
- Work commute trips made by walking and biking, as reported by the American Community Survey
- Pedestrian and bicycle counts at key locations

People can travel anywhere in the community by walking or biking on safe, comfortable and efficient networks

- Major streets with sidewalks on both side
- Major streets with bike lanes or other bicycle facilities
- Percentage of residents within a quarter-mile of the FUTS system
- Crossing distances along major streets

Walking and biking is safe and comfortable

- Pedestrian and bicycle comfort indexes
- Pedestrian and bicycle crash rates

- Community perception of walking and biking as indicated through community surveys
- Completion of low-stress bicycle network

Biking and walking are celebrated as a part of Flagstaff's identity

- Walk and bike-friendly community designations
- Walkscore and Bikescore
- National rating, rankings, and recognition
- Walking and biking focused events

Transportation in Flagstaff has a lower climate impact

- Total greenhouse gases from emissions
- Total vehicle miles traveled (VMT)
- Per capita VMT

Walking and biking are enjoyed by everyone in the community

- Walking and bicycling participation by gender, age, and race
- Geographic distribution of walking and biking facilities
- Pedestrian and bicycle counts in low income neighborhoods

Targets

Six targets for walking and biking are established in this plan for mode share, safety, and recognition. Targets are set for two points in the future: short term targets are established for 5 years from now (2025) and long-term targets are set at 20 years (2040).

Table 5.X
Walking and biking targets

Target	Current	5 years	20 years
Mode share			
Combined walk-bike-transit (all trips)	27%	38%	54%
Combined walk-bike-transit (work commute)	17%	24%	34%

Safety			
Pedestrian and bicycle fatalities	3	0	0
Total pedestrian and bicycle crashes	81	65	41
Recognition			
Walk friendly	Bronze	Gold	Platinum
Bike friendly	Silver	Gold	Platinum

Mode share information is collected from MetroPlan's Trip Diary Survey for all trips, and from the American Community Survey for the work commute. Target mode share numbers reflect a 40 percent increase in walk, bike, and transit trips within five years, and a 100 percent increase, or doubling of current mode share, in 20 years.

Safety statistics are taken from annual crash numbers as reported to the City by ADOT. The City annually collects this information. Our target is zero pedestrian and bicyclist deaths for the next 20 years, as well as a 20 percent reduction in crashes after five years, and a 50 percent reduction in 20 years.

Taken together, the safety and mode share targets mean that Flagstaff's goal is to cut pedestrian and bicycle crashes in half, even as the number of pedestrians and bicyclists double.

Recognition targets are based on the Walk and Bike Friendly Community programs. In both cases, the City aspires to Gold status within five years, and Platinum designation by 2040.

5 Implementation

This section addresses opportunities for implementation of this plan.

Implementation is the product of a things we do and decisions we make every day. Every decision, every **project, every thing that's built, no matter how large** or small, either brings us closer to the vision and goals of this plan, or it moves us away.

First 10 - dozen things

This list includes the most important actions that should be done first to build the foundation for future active transportation improvements.

- 1 Use available funding from the transportation sales tax and first/last mile grant to construct priority projects within 5 years (Policy 1.1)
- 2 Explore grants and other funding sources, as well as other means for implementation, to leverage available funding for new infrastructure and programs (Policy 1.7)
- 3 Develop detailed design guidelines and standards for pedestrian facilities, bikeways, and FUTS trails, and initiate amendments to the Zoning Code and Engineering Standards to incorporate (Policy 5.5)
- 4 Review Engineering Standards and Zoning Code, especially street standards
- 5 Establish a complete transportation process for all transportation plans and projects that incorporates broad community objectives for community character, sustainability, public health, economic vitality, environmental stewardship, and equity (Policy 5.2)
- 6 Review policies and practices for maintenance and snow removal on pedestrian and bicycle facilities and make recommendations for improvement (Policies 2.1 and 2.2)
- 7 Develop a new process, guidelines, and standards for closures and detours for pedestrian and bicycle facilities (Policy 2.4)
- 8 Enhance and supplement available information and maps to remove barriers and make it easier to walk and bike (Policy 3.1)
- 9 Implement a variety of strategies to enhance the availability and quality of bike parking (Policy 1.3)

- 10 Inventory, prioritize, and implement enhancements and repairs along the FUTS system, including improvements to support accessibility for all users (Policies 2.5 and 3.4)
- 11 Adopt a complete streets policy (5.2)

Active transportation strategic plan

Every year following adoption of the ATMP, an active transportation strategic plan should be prepared to serve as a guide for the next steps of implementation. The strategic plan should include an assessment of progress made on implementation in the previous year and a list of priority actions and goals for the coming year. The document can be developed by the PAC, BAC, and Transportation Commission, with community and stakeholder engagement.

Infrastructure

Over the next 20 years, the City will have a variety of opportunities to build new or enhanced walking and biking facilities. At this time, there are two primary funding sources for pedestrian and bicycle infrastructure; the transportation **sales tax and Mountain Line's** Section 5307-5339 first mile/last mile grant. These two will generate a combined \$34.5 million for pedestrian and bicycle projects over the next 20 years, including \$15.5 million in the first five years.

Other potential opportunities include City capital projects, private development, Mountain Line transit projects, and work undertaken by other agencies like ADOT, Coconino County, and NAU. Grant funding also holds significant potential. In all cases, dedicated sales tax funding can help leverage other opportunities, and we need to be vigilant and nimble enough to identify and take advantage when they arise.

Transportation sales tax

In November of 2018, Flagstaff voters approved Proposition 419, which extends the 2000 transportation sales tax for an additional 20 years, from 2020 to 2040. The transportation sales tax will be a significant, dedicated sources of funding for pedestrian and bicycle projects over the next 20 years.

- Pedestrian and bicycle projects. A total of \$29 million is anticipated from the transportation sales tax as a set-aside for pedestrian and bicycle projects. This funding will be moderately front-loaded, with \$2 million available in each of the first seven years of the tax and \$1.15 allocated in each of the remaining 13 years. This funding supports construction of most of the pedestrian and bicycle projects identified as first priorities.
- Street projects. Several major roadway projects are also planned with proceeds from the transportation sales tax over the next 20 years. Some of

these road projects involve widening and completion of existing streets, while others include construction of new street segments. In all cases, these street projects will include sidewalks, bike lanes and bikeways, FUTS trails, and crossings where they are missing or planned. Planned major street projects include:

- Lone Tree overpass | Route 66 to Butler
- Lone Tree Road | Butler to Pine Knoll
- Butler Avenue | Little America to Fourth St
- Fourth St/Butler Ave intersection
- West Route 66 | Woodlands Village to Woody Mountain
- J.W. Powell Boulevard | Lone Tree to Fourth St
- J.W. Powell Boulevard | Pulliam to Lake Mary

Section 5307-5339 first mile/last mile grant

In late 2020 Mountain Line was awarded a Section 5307-5339 grant of \$5.5 million for first mile/last mile pedestrian and bicycle infrastructure from the Federal Transit Administration through the ADOT. Per federal guidelines, this can include any pedestrian project that is within a half-mile of transit, and bicycle projects that are within three miles.

The City has been working with Mountain Line to identify pedestrian and bicycle projects to fund with the grant. **Potential projects are drawn from the City's** prioritized list of pedestrian and bicycle projects, with additional consideration given to those projects that directly support transit. Potential projects generally include missing sidewalks, enhanced crossings, and bikeways.

The federal grant covers 80 percent of project costs, and the City is responsible for matching the remaining 20 percent. Funds for the match will be drawn from transportation tax proceeds. Grant funds will be available within the first five years of the capital program, **although the City's target is to spend the funds** within three.

Private development

New private development often constructs pedestrian and bicycle infrastructure as part of its required public improvements. Division 10-30.50 of the Flagstaff Zoning Code requires all new development to construct public improvements associated with the development, including sidewalks, bike lanes, FUTS trails, and other facilities identified in this plan.

Private development will continue to be an important source for construction of new pedestrian and bicycle infrastructure. In many cases it also represents opportunities to upgrade or enhance existing facilities.

Some considerations infrastructure that is built as part of private development:

- Reconstruction of existing infrastructure. In some cases, existing pedestrian and bicycle facilities may be present but are in disrepair do not meet current standards. Private development should be responsible for reconstructing existing facilities when they do not meet minimum standards for accessibility, when they are in a state of disrepair to the point of losing functionality, and where they fall far below current standards. Proportionality should be considered as well; more can be expected of larger projects.
- Match existing or meet standards. New development should always build infrastructure to current standards, rather than matching existing conditions that are below standard.
- Phasing of improvements. Phasing of pedestrian and bicycle facilities should be avoided, and whenever possible completed with the first phase of development. Sidewalks, bike lanes, and FUTS trails are all linear facilities that are not functional until they are complete and connected. Streets are not allowed to be Built without basic connectivity.
- Fair share contributions. In cases where new development helps create a need for an off-site facility identified in this plan, the City should consider **requiring a “fair share” contribution as identified in a traffic impact analysis.** Large development project, including high-density student housing projects, may create a need for pedestrian and bicycle facilities that are not identified in this plan.

Capital improvement projects

Pedestrian and bicycle facilities are frequently included as part of City capital improvement projects, especially street projects. This can be more efficient and less costly than building them as stand-alone projects, but it may be necessary to provide additional funds to offset the increase in cost. City capital projects should therefore be monitored for opportunities to include pedestrian and bicycle improvements. Pedestrian and bicycle funding should be flexible enough to take advantage of opportunities when they arise.

- Street projects. In addition to the major planned street projects described above, many street projects, including small projects like installation of a traffic signal or chip seals and overlays, provide an opportunity to complete missing facilities or enhance existing.
- Road repair and street safety projects. **The City's Road Repair and Street Safety** program, which is funded by a dedicated 20-year sales tax that was approved by Flagstaff voters in 2014, is a potential source for some improvements. Construction of missing sidewalks was intentionally left out of this program; however it does include replacement of sidewalk segments and curb ramps that do not meet ADA and restriping to include bike lanes as part of street resurfacing or reconstruction.

Link | road repair and street safety program

<https://www.flagstaff.az.gov/3210/Road-Repair-and-Street-Safety>
<https://flagstaff.maps.arcgis.com/apps/webappviewer/index.html?id=3a0d02f61342459a995b8b259cc07622>

- Utility projects. Sewer and water line projects typically include maintenance roads for access, built to FUTS standards as required by the Engineering Standards. Ten feet is wide enough for a maintenance access road, and utility traffic is typically light enough to not impact trail use. In many cases utility access roads follow the same alignment as existing or planned FUTS trails. In other cases, utility corridors are used informally for neighborhood access and shortcuts. These facilities should be designed to consider recreational and commuter use from pedestrians and bicyclists.

Photo | Utility access road used as a FUTS

- Rio de Flag flood control project. The Rio de Flag flood control project is an extensive public works project and a significant opportunity for major pedestrian and bicycle enhancements. Planned FUTS trails follow much of the corridor, and two underpasses are critical components of a planned north-south pedestrian and bicycle corridor through Downtown and Southside. Capital funding from the transportation sales tax can help leverage additional or enhanced pedestrian and bicycle improvements with the project. Where it is not possible to make improvements as part of the project, the Rio de Flag flood control project should be designed in a way to allow pedestrian and bicycle facilities at a future date.

Transit projects

Because walking and biking directly support transit, pedestrian and bicycle infrastructure can often be included in federal grants and funding for transit projects. Mountain Line has several on-going capital projects that could include pedestrian and bicycle elements.

- Bus Rapid Transit
- Downtown Connection Center
- Route 66/Highway 89/Kaspar Drive intersection
- Bus stop mobility project

Grants

Historically grant funding has been an important source of funding for pedestrian and bicycle infrastructure, particularly FUTS trails. In recent years grant funding has been more difficult to find, however over the next few years there may be additional opportunities as federal transportation funding priorities shift in favor of more sustainable transportation options, and as federal funding for infrastructure and surface transportation are considered.

Active transportation should be at the table when virtually any transportation grant is considered and developed for submittal. Pedestrian and bicycle facilities might be the primary grant focus or a complementary piece of another project that meets ATMP and grant objectives. A few of these grant programs may support large scale pedestrian and bicycle projects.

- Rebuilding American Infrastructure with Sustainability and Equity (RAISE). Federal grant program, formally known as BUILD and TIGER, for all types of transportation projects. Projects are typically somewhat large-scale, as grant amounts range from \$5 to \$25 million. One potential project is implementation of the primary bikeways network.

www.transportation.gov/RAISEgrants

- Transportation Alternatives (TA): formerly known as Transportation Enhancements, this federal program funded \$4.5 million for FUTS trails and \$1 million for sidewalks and streetscape between 2000 and 2010. In 2010 the state opted to discontinue the grant for small urban and rural areas, so TA grant funding has not been available to Flagstaff for more than 10 years. There is a chance the program could be restarted again in the future.

https://www.fhwa.dot.gov/environment/transportation_alternatives/

- Highway Safety Improvement Program (HSIP). Federal grant program intended to reduce fatalities and serious injuries on public roadways. The program is managed by ADOT as a statewide competitive grant program. Pedestrian and bicycle projects are eligible, but must be directly related to reducing known crash and injury problems.

<https://safety.fhwa.dot.gov/hsip/>
<https://azdot.gov/business/transportation-systems-management-and-operations/operational-and-traffic-safety/arizona-0>

- Recreational Trails Program (RTP). Federal grant for recreational trails, managed by Arizona State Parks. This program has been used most recently to fund installation of FUTS signing. Grants are limited to \$80,000, so the program would be best for small-scale spot enhancements.

https://www.fhwa.dot.gov/environment/recreational_trails/
<https://azstateparks.com/grants/>

- Federal Lands Access Program (FLAP). Federal program to improve transportation access to federal lands. The City and County both used this program to add paved shoulders to Lake Mary Road, to enhance bicycle access to the National Forest.

<https://highways.dot.gov/federal-lands/programs-access>

- Sections 5307/5339. Federal program for transit capital projects that can include supporting pedestrian and bicycle facilities. In 2020, Mountain Line was awarded a \$5.5 million grant for first mile/last mile pedestrian and bicycle projects through this program as described above.

<https://azdot.gov/sites/default/files/2019/08/5307-5339-new-process.docx>

- Section 5310. Transit grant to enhance mobility for seniors and people with disabilities. Mountain Line has used this grant to improve accessibility at bus stops.

<https://azdot.gov/planning/transit-programs-and-grants/5310-enhanced-mobility-seniors-and-individuals-disabilities>

- Private foundation grants. These are periodically available from various organizations to help promote walking and biking, and typically fund programmatic elements or small infrastructure projects. Grant amounts tend to be on the smaller side but are worth monitoring for the right opportunity. These grants are good candidates for coordination with community partners.

Pilot programs

Pilot projects are encouraged as way to test new facilities without having to make a long-term investment in permanent infrastructure. Pilot projects allow an opportunity to try new concepts and experiment with design details. They are also an opportunity to gain internal and public feedback and acceptance in advance.

Tactical urbanism, also referred to as LQC (lighter, quicker, cheaper) project or pop-up projects, are a community-driven version of pilot projects. It is often used as a demonstration of how right-of-way space could be used differently, to enhance community character and promote livability in place of just movement or storage of vehicles.

Examples of pilot projects or pop-up facilities might include protected bike lanes, parklets, outdoor seating and dining, street trees and greenery in planters, crossing islands, art installations, and wayfinding signing. These projects often use temporary measures such as paint, planters, and street furniture.

Processes

Guidelines and standards

Detailed guidelines and standards make **the City's** expectations clear and provide explicit direction for pedestrian and bicycle infrastructure. At present the City

has few guidelines for walking and biking facilities and few enforceable standards, leading to inconsistent and often unsatisfactory results.

- Design guidelines. Good design and getting the details right are critical to successful pedestrian and bicycle facilities. While Chapter 8 of this document includes basic guidance, it would be beneficial to prepare a separate document of comprehensive design guidance as a follow-up to the ATMP.
- Regulations. **The City's Zoning Code and Engineering Standards are the two** primary regulatory documents for development and infrastructure. Both should be reviewed and revised as necessary to incorporate any relevant recommendations or guidelines from this ATMP and future design guidelines.

Project review

Development review

Development review is a collection of internal City processes – from rezoning requests to construction plan review – that evaluates development proposals for conformance to existing plans, guidelines, and regulations. The development review process helps assure that all private development projects and public capital projects comply with applicable standards and guidelines. The process also provides a forum for discussion and resolution of details that may arise from the unique circumstances of a project and may not be definitively addressed in established standards. The ATMP will help provide additional guidance for these reviews.

Discretionary review

The goals and policies of the ATMP are considered in discretionary decision-making by the Planning and Zoning Commission, City Council, and City staff. The Planning and Zoning Commission and the Council are responsible for making discretionary land use decisions that modify development rights, such as zoning map amendments or annexations. Approval depends, in part, on a finding of whether the proposed changes are consistent with the Regional Plan and relevant specific plan goals and policies. City staff, the Planning and Zoning Commission, and the City Council will review the proposed development against applicable goals and policies to determine whether the modifications are consistent with this Specific Plan.

Ongoing plans and programs

The City and other transportation agencies in the region are responsible for a number of on-going programs and planning efforts, in many cases mandated by state and federal guidelines. Going forward, these plans and programs should reflect and help advance the principles and projects identified in the ATMP:

- City of Flagstaff
 - Regional plan
 - Master and specific plans
 - Neighborhood plans
- Coconino County
 - Community area plans
- Mountain Line
 - Five-year transit plan
 - Human service – public transit coordination plan
- NAU
 - Campus master plan
 - Sustainability plan
- MetroPlan
 - Regional transportation plan
 - Regional safety scan
 - Transportation improvement program (TIP)
 - Unified plan and work program (UPWP)
- ADOT
 - Statewide transportation improvement program (STIP)
 - Pedestrian and bicycle safety action plans
 - State highway safety plan

Community partners

While the City will have primary responsibility for many of the goals, policies, and strategies in this master plan, there is still a substantial and important role in implementation for our community partners and stakeholders, including City divisions and sections, other transportation agencies, boards and commissions, and outside advocacy and interest groups. Enhancing walking and biking requires a concerted community effort and will only succeed with broad, community-wide participation and support. There are a number of ways we can promote partner and stakeholder involvement:

- Find overlapping and compatible goals. It is important to understand your **partners' goals and objectives, and to explicitly acknowledge how active** transportation furthers their mission and how they can support walking and biking.
- Build relationships in advance. Reach out to partners, find the right contacts, and establish working relationships in advance. When needed we can call on each other for support or assistance.

- Share information. Just knowing about current projects and efforts covers a lot of ground and can identify opportunities where we can assist each other.
- Regular check-ins. Keeping in contact can be as simple as including partners on our email list for notifications and making sure that we are on theirs. Some relationships are important enough to warrant regular meetings.

Walking and biking programs

Programmatic elements are a critical component of a well-rounded, comprehensive approach to walking and biking. **Of the five E's referenced in traditional multimodal transportation planning, only one, Engineering, refers to walking and biking infrastructure.** The remaining four – Education, Enforcement, Encouragement, and Evaluation – describe supportive programs like Safe Routes to School, Bike to Work Week, walking and biking safety classes, events, and group rides. **To date the City's main emphasis has been on infrastructure enhancements,** and there is little in the way of programmatic efforts in support of walking and biking.

The ATMP identifies a wide array of potential walking and biking programs, but there are two significant obstacles to implementation. The first is that there is no dedicated funding for walking and biking programs. Although the transportation tax can be used for programmatic components, no part of that funding has been set aside, and diverting some would require trade-offs with infrastructure improvements. The second relates to staffing resources. At present the City has one full-time position that manages bicycle, pedestrian, and FUTS planning. The Bicycle Friendly Community Gold standard is one bicycle program staff member per 33,000 population, which for Flagstaff would mean 2.25 positions just for the bicycle program.

6 Walking and biking infrastructure

Infrastructure refers to the physical facilities for walking and biking, such as sidewalks, bike lanes, urban trails, and crossings. Functional and comfortable facilities are the backbone to promote and encourage active transportation. This section describes recommendations for missing and needed infrastructure.

Infrastructure intent

The plan for infrastructure in this chapter is intended to address some of the challenges with walking and biking facilities identified in Chapter 2. More specifically, the objective for infrastructure is to:

- Complete missing facilities and gaps in walking and biking networks.
- Plan for additional enhanced and beacon crossings at key locations to limit the extent to which major streets create barriers in our neighborhoods.
- Add important links and connections for a most robust system of FUTS trails, including improvement and enhancements to existing trails, and plan for seamless connectivity to **the region's network of recreational trails and open space**.
- Establish a city-wide low-stress bicycle network that includes higher level protected and separated facilities and comprehensive wayfinding.
- Provide better pedestrian and bicycle access to and from residential neighborhoods, especially those that are isolated or lack basic infrastructure.
- Address important segments and crossings in the vicinity of bus stops to facilitate better access to transit.
- Allow seamless walking and biking connectivity between the NAU campus and the community.

Targets for the first five years

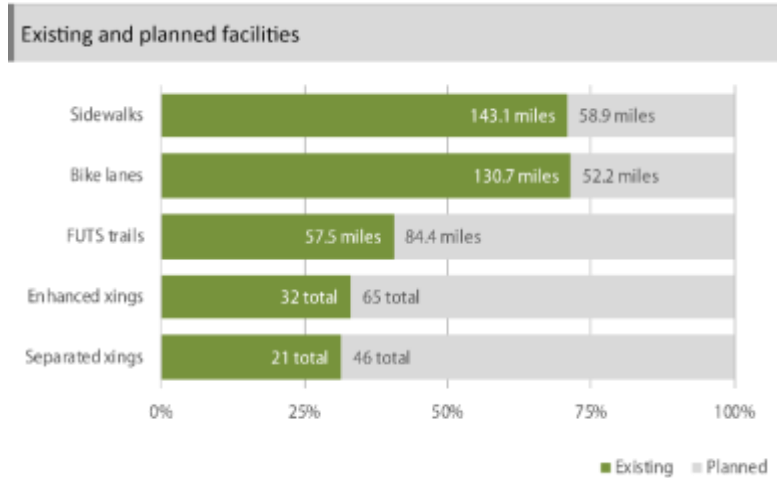
- 1.4 miles of missing sidewalks
- Sidewalk infill segments
- 42 miles of new or upgraded bikeways
- Including XXX or protected, separated, cycletrack, FUTS
- 3.1 miles of FUTS trails
- Three new enhanced crossings
- Three grade-separated crossings

Inventory and prioritization

Four step process

Flagstaff has many needs for new and enhanced pedestrian and bicycle infrastructure. To help organize, evaluate, and prioritize these needs in a systematic way, a four-step process has been used to identify, plan, and prioritize basic infrastructure including sidewalks, bikeways, enhanced crossings, bridges and tunnels, and FUTS trails.

- **Inventory.** The first step conducts a detailed inventory of walking and biking facilities, to determine what is existing as well as identify facilities that are missing or needed.
- **Implementation.** This step categorizes new infrastructure based on how it will be built. Some of the missing facilities will be built as part of other projects, typically either private development or public roadway projects. Remaining facilities, which are not part of a public roadway or private development, must be funded and constructed by the City as stand-alone capital projects.
- **Priorities.** A formal prioritization process, described in more detail below, helps determine which facilities are most needed and will provide the most benefit. Only the facilities that will be built as stand-alone projects are prioritized; facilities that are part of another project are not included in this step.
- **Cost estimates.** For the final step, concept-level cost estimates are prepared for missing facilities that are stand-alone and not part of another project. Cost estimates allow us to **include priority projects in the City's capital planning and programming process** as described below.



Prioritization

Four prioritization factors are used to determine a priority score for each facility type. Of the four factors, three are common across all types of facilities:

- **Generators and attractors.** Include places and land uses that encourage and support walking and bicycling trips.

- Social factors. Describe circumstances or conditions that make people more likely to walk or bike and include traditionally underserved populations who would benefit from enhanced mobility.
- Need and functionality. subjective but represents an aggregate of informal information gathering over time, including **staff's knowledge and** experience, anecdotal evidence, results of previous surveys and conversations with the community, and discussions at Pedestrian and Bicycle Advisory Committee meetings.

A fourth factor for prioritization is specific to each facility type:

- Sidewalks. Pedestrian comfort index: a quantitative measure of how comfortable a street is for pedestrians, based on a variety of street characteristics. Additional information is included in Chapter 2, as well as Working Paper XX.
- Enhanced crossings. Crossing comfort index: a composite score that indicates how difficult it is to cross the street. Additional information is included in Chapter 2, as well as Working Paper XX.
- Grade-separated crossings. Crossing comfort index: same as described above for enhanced crossings, except that the railroad and interstates, where new at-grade crossings are prohibited, are given a score of 100.
- FUTS trails. Completion and connectivity: qualitative evaluation of the extent to which the planned FUTS will connect the system, complete gaps, and serve new neighborhoods or areas.

The four factors for each facility type are combined to generate a priority score of 0 to 100, where a higher score indicates a higher priority. Projects are then divided into four priority levels – First, Second, Third, and Fourth - based on the score.

Call out | Generators and attractors

Generators and attractors

- Schools
- Parks
- Transit stops
- Residential neighborhoods
- Commercial areas
- Employment centers
- Institutions
- NAU and CCC campus

Call out | Social factors

Social factors

- Elderly populations aged 65 and over

- Children under 18
- Persons with disabilities
- People of color
- Household poverty status
- Households without access to a vehicle
- Affordable and assisted housing locations
- Human service facilities

Call out | Need and functionality

Need and functionality

- Serves an important function
- Identified as a community need
- Expected level of use
- Community support
- Difficulty or constructability

Capital planning and programming

The Capital Improvements Program (CIP) is a **component of the City's annual Budget and Financial Plan** that establishes our short-term plan for construction of needed public improvements projects. The CIP is a planning document that represents our priority projects over the next five years. Projects identified for the first year of the program are funded at the beginning of the following fiscal year and can proceed to design and construction. Years two through five of the capital program indicate when other priority projects are anticipated to receive funding for design and construction.

Pedestrian and bicycle projects included in the five-year program are those which are most needed and the highest priority from among those that have been identified in the First Priority category.

Infrastructure recommendations

This section provides a summary of planned and potential pedestrian and bicycle infrastructure. **Refer out to specific documents or links for further information...**

Sidewalks

The primary focus for sidewalk infrastructure is completing priority segments along major streets. Other opportunities for improvements and **enhancements...**

Inventory

Flagstaff's public streets include just over 300 miles of existing sidewalks. However, the sidewalk inventory also identifies 58.0 miles of missing sidewalks along major streets, which includes arterial, collector, and commercial streets.

Table | Existing and missing sidewalks

Implementation

Of the 58 miles of missing sidewalk along major streets, a total of 13.1 miles are anticipated for construction as part of another City capital project, including planned roadway projects. This includes 5.4 miles of missing sidewalks to be constructed as part of roadway projects funded through the transportation sales tax over the next 20 years. Future private development will account for 8.3 miles of missing sidewalks.

This leaves a total of 35.4 miles of sidewalk that must be built as sidewalk projects, at an estimated cost of \$21.7 million.

Table | Missing sidewalks by implementation

Priorities

Missing sidewalks by priority are depicted on Map 5.X on page XX. Sidewalk projects that have been identified as First Priority comprise 4.9 miles total at an estimated cost of \$3.04 million.

Table | Missing sidewalks by priority Map | Missing sidewalks by priority

Other sidewalk considerations

- **Quality and condition.** The sidewalk inventory covers only the presence of a sidewalk. It does not address the quality, adequacy, condition, or accessibility of a sidewalk, such as if it is wide enough or lacks a parkway, if it is cracked or heaved or otherwise in poor condition, or if curb ramps are missing or substandard. **However, the City's Public Works Division** has initiated a sidewalk replacement program to more comprehensively assess and repair sidewalks in poor condition. Additionally, any City capital project or private development project should consider repairs or upgrades to existing sidewalks as necessary.
- **Infill sidewalk program.** A number of short missing sidewalk segments, typically less than 200 feet in length, are categorized as infill projects. These segments are generally less complicated to engineer and build and have been grouped into a single project for implementation. Forty-six individual segments are included, totaling 1.7 miles in length at an estimated cost of 1.0 million.
- **Neighborhood access.** In several cases, sidewalks have been prioritized along the main collector streets serving neighborhoods that do not have sidewalks. This encourages and allows a safer and more comfortable way for

residents to walk to or from their neighborhood, even if local streets within the neighborhood do not have sidewalks. Some examples of streets with planned sidewalks for neighborhood access:

- Beaver St/San Francisco St into the NoHo neighborhood
 - Meade Ln into the Coconino Estates neighborhood
 - Cherry Ave into the Cherry Hill neighborhood
 - Steves Blvd into the Lower Greenlaw neighborhood
 - Walapai Dr into the Bow and Arrow neighborhood
- Neighborhood sidewalks. Local residential streets have not been included in the missing sidewalk inventory, primarily because the volume of missing sidewalks on local streets would overwhelm available resources. However, important missing segments not included in this inventory may be identified in subsequent planning efforts, including future neighborhood plans or an update of the five-year transit plan.

Bikeways

Historically, Flagstaff has accommodated bicyclists with conventional bike lanes on collector and arterial streets, as well as paved FUTS trails along some streets to provide an alternative for bicyclists who are not comfortable on the street.

The ATMP introduces a more robust plan for bikeways that features a variety of facilities, such as bike lanes, protected or separated facilities, FUTS trails, and crossings and intersection treatments to ensure comfort and safety for all users. The plan also organizes the bikeways network into a cohesive system so bicyclists can travel conveniently and easily to destinations and neighborhoods throughout the community.

Additional information on bikeways is included in Chapter 9 of this document and in the [Bikeways Master Plan](#)

Inventory

In all, a total system of 153 miles of bikeways is described in the Bikeways Plan, including 14 miles of primary routes and 30 miles of secondary bikeways.

How selected...

Implementation

The intent of is to front-load implementation to create a functional and visible bikeway system within five years:

- Complete and connect primary and secondary bikeways to the greatest extent possible, including using interim facilities.

- Build a few high-visibility and impactful bicycle enhancements that include higher level facilities such as protected or separated bike lanes and protected intersections.
- Introduce other types of advanced facilities to better accommodate bicyclists, including bike boulevards, two-stage left turns, and cross bike markings.
- Implement basic elements of important third and fourth level bikeways, including bike lanes and bike routes, to help flesh out a more robust overall network.
- Pull the network together through a comprehensive system of signing, branding, identification, mapping, and information.

Priorities

A total of 65 miles are identified as First Priority bikeways.

Other considerations

FUTS trails

Infrastructure recommendations for FUTS trails primarily includes construction of identified high priority segments. Other opportunities include improvements and enhancements to existing FUTS segments, as well as implementation of affiliated trail facilities such as forest access points, single track connectors, greenways, and trailheads.

Inventory

There are currently 58 miles of existing FUTS trails in Flagstaff. The master plan includes another 77 miles of FUTS, for an ultimate system of 135 miles.

Implementation

For planned FUTS trails, a total of 9.2 miles will be added as part of future capital or roadway projects. This number includes 6.0 miles of future trails that will be built with roadway projects funded through the transportation sales tax. Future development will be responsible for 25.6 miles of FUTS trails.

The remaining 38.1 miles will be planned, funded, and built as individual FUTS projects. The total cost is estimated at \$29.4 million.

Priorities

A total of 4.6 miles of planned FUTS trails are included as First Priority projects, at an estimated cost of \$4.9 million. Priority trails are illustrated on Map 5.X.

Improvements and enhancements

Numerous improvements and enhancements have been identified along existing FUTS trails in the interest of taking care of the trails we already have. Planned improvements and enhancements include:

- More comfortable/safer crossings
- Improved accessibility for the entire community
- Permanent fixes for on-going maintenance issues
- Drainage improvements
- Surface repairs, including resurfacing with new aggregate
- Improved/additional access points
- Fencing replacement
- Signing and wayfinding enhancements

Related facilities

- Forest access. Forest access describes locations around the perimeter of the city where people gain access to regional open space and the surrounding national forest. There are dozens of locations around Flagstaff that are currently used for access, but few of these include formal trail improvements or have legal rights-of-access. Planning for these locations will help protect and enhance access to regional open space.
- Greenways. FUTS planning includes a system of greenway corridors along FUTS trails. In some cases, greenways can be formal and part of the regional park and open space system, in others the corridor can be informal, somewhat narrow, and specific to the trail. Existing and planned FUTS trails often follow natural corridors such as hillsides and washes, so there is already a relationship between the FUTS and open space system. Greenways significantly enhance the experience for trail users and give access to some of our most scenic places.
- Single track connections. In a handful of locations, where planned FUTS connect to the forest, the trail may not need to be built to a full FUTS standard when a singletrack trail will suffice. Singletrack trails are significantly less expensive to build than FUTS-standard trails, and in many cases can be built with volunteers. In some cases, a singletrack trail will suffice as an interim connection until a more permanent FUTS can be built; in others the singletrack trail is suitable as a permanent facility.
- Trailheads. Describes major points of access to the FUTS system where vehicle parking is available. In general, vehicle parking is not planned or programmed as part of the FUTS system, as it is intended to easily accessed

on foot or by bike from all parts of the city. However, it is acknowledged that there are circumstances for which parking is needed or beneficial. At present, there are four locations with dedicated parking for FUTS, and another five where parking for trails is available at City parks or facilities. Ten other locations have been identified for new or improved trailhead locations.

- Trail hubs. Trailhead locations where there is significant connectivity between the FUTS system and surrounding recreational single-track system. At these locations there is an opportunity to emphasize connectivity between the two trail systems, and enable a seamless link. Eleven existing or planned locations have been identified as trail hubs.
- Connections to outlying communities. The desire for pedestrian and bicycle connectivity to neighborhoods outside Flagstaff – including Bellemont, Fort Valley, Timberline-Fernwood, Doney Park, Cosnino, Mountaineer, Kachina Village – has been consistent in community surveys over the past several years. At present, access is limited to major highways and interstates. While FUTS-standard pathways would be ideal as a facility, in the short term it may be possible to identify Forest Service roads, including those close to vehicle use, to make the connections. Establishing such routes would require signing and wayfinding, but potentially few other physical improvements.

Enhanced crossings

Enhanced crossings are designed with features to help slow traffic, shorten crossing distances, break crossings into parts, increase visibility, or in general make the crossing safer and more comfortable. On wide, fast, busy streets, as well as at locations where there are high numbers of pedestrians, enhancements can include flashing pedestrian beacons.

There are numerous street corridors in Flagstaff that are very difficult to cross due to the speed, volume, and width of the street, and where there are few safe and comfortable crossings provided.

Inventory

There is a total of 10 existing beacon crossings on Flagstaff streets, and another nine street crossings that can be considered enhanced. An additional 59 locations have been identified for potential new crossings, based on several considerations:

- Along long stretches of major streets where there are no crossings
- Where there is an existing need, based on observation, anecdotal information, surveys, and community feedback

- Locations with pedestrian generators and attractors on one or both sides of the street, including transit stops
- Spots where there are known problems, crossing difficulties, or a pedestrian crash history

It is worth noting that the identified locations are preliminary and subject to further review to determine their feasibility and optimal location.

Implementation

Forty-one of the 59 locations would be built through stand-alone crossing projects, at an estimated cost of \$18.9 million.

Eight crossings could be implemented as part of future roadway projects, including four that are planned in the next 20 years as part of transportation tax-funded projects. One crossing will be part of a private development project. Nine crossings are planned in conjunction with future FUTS projects.

Priorities

Eight enhanced crossings are considered First Priority projects, at an estimated cost of \$3.6 million. Map 5.X shows planned crossing locations by priority.

Other enhanced crossing considerations

- Future roundabouts or signalized intersections. There are also 17 intersection locations where a future traffic signal or roundabout is planned that will help address the need for crossing improvements. However, the timing of the signal or roundabout is uncertain, and in the interim an enhanced or beacon pedestrian crossing may be warranted.
- Bikeways crossings. There are a variety of crossing types that are designed specifically to accommodate bicyclists, including bike hawks, toucans, and protected intersections. Bikeway-specific crossings are considered in the Bikeways Master Plan, and in a few cases will overlap with the planned crossings described in this section.

Grade-separated crossings

Grade-separated crossings include bridges and tunnels for the exclusive use of pedestrians and bicyclists, as well as street underpasses and overpasses that include walking and biking accommodation. Grade-separated crossings can add significant value to the walking and biking environment, but they are very expensive. As a result, they must be planned judiciously and designed with care, and reserved for locations where they are most needed and will work best.

Inventory

There are 22 existing grade-separated crossings in the city, including eight tunnels and two bridges for the exclusive use of pedestrians and bicyclists, and 12 underpasses or overpasses.

Forty-seven new locations for grade-separations have been identified, including 33 new bridges and tunnels and 14 new or improved underpasses and overpasses. Locations for new grade-separated crossings are based on several considerations:

- Locations where planned FUTS and major bikeways cross the interstates, BNSF tracks, and busy streets
- Logical places to cross the interstates or railroad, including places where there is evidence that people are already crossing
- Where there are long distances between crossing along the interstate and BNSF tracks
- At existing street underpasses and overpasses that lack accommodation for pedestrians and bicyclists
- Along future roadways where FUTS crossings are planned, and there is an opportunity to build grade-separated crossings into road construction

Implementation

Twenty-one of the planned grade-separated crossings must be planned, funded and built as individual projects, at a total estimated cost of \$68.0 million. Another twenty-one are planned with future roadways, including seven new separated crossings in the next 20 years on roadways funded through the transportation tax.

Table | Grade-separated crossings by implementation

Priorities

Four grade-separated crossings are included in the First Priority category. These are estimated to cost \$15.0 million. Map 5.X shows the location of all planned grade-separated crossings and their priorities.

Other considerations

Completion of incomplete overpasses and underpasses
New overpasses and underpasses (by default part of other projects)

Other facilities

Neighborhood connectors

This describes short connecting sidewalks or pathways for pedestrians and bicyclists that are not aligned along public streets but function as shortcuts to the street network. Examples include connections between adjoining residential neighborhoods and access from a residential area to a commercial center.

Planning and design guidance for neighborhood connectors is included in [Section 8](#).

Neighborhood connectors exist in a handful of locations around the community. Notably, there are six in the Boulder Point neighborhood. Six additional locations for neighborhood connectors have been identified:

- Between Evergreen Dr and Mesa Dr
- Between Beaver St and Marion Dr
- Between Fourth St and the County Health Department
- Between Lockett Rd and King St
- Between Mt Elden Dr and Bushmaster Park
- Between Bushmaster Park and Park Santa Fe shopping center

There may other potential locations for neighborhood connectors identified as part of review of new development proposals.

NAU access

The campus of Northern Arizona University, with more than 20,000 students, is **by far Flagstaff's most significant generator and attractor of pedestrian and bicycle trips**. As a result, providing frequent, convenient, and comfortable access to NAU for walking and biking is critical as a link between the community and campus.

There is a total of 15 existing points of access to campus for pedestrians and bicyclists, as depicted on Map 5.X. Nine of the existing access points are streets, three are sidewalks, and three are FUTS trails.

Six additional locations have been identified as potential future access points to campus, including one new street connection, one sidewalk, and four FUTS trails. Additionally, pedestrian and bicycle enhancements are planned for three of the existing street connections, in conjunction with planned bikeways.

7 Planning considerations

Pedestrian and bicycle accommodation do not exist in isolation; they are an **integral part of Flagstaff's larger** context of community planning and development, land use and urban form, and streets and transportation.

This section describes considerations for walking and biking within that larger context, at four levels:

- Our overall approach to transportation planning
- **Flagstaff's land use, urban form, and development patterns**
- Street character and environment
- Planning and design of facilities for walking and biking

Transportation planning

Flagstaff's overall approach to transportation planning is seminal for walking and biking. A broad-based, holistic approach supports walking and biking, while a narrow focus on the movement of automobiles is to its detriment.

Transportation planning has larger impacts as well on numerous aspects of a community including health, economic vitality, environmental sustainability, and overall wellbeing. The following concepts discussed below are at the core of a broad-based, holistic approach to transportation planning with positive community impacts.

Travel demand management

Travel demand management, or TDM, is a transportation policy approach that reduces demand for single-occupant vehicle use, while simultaneously encouraging use for sustainable travel modes, including walking, biking, and transit. Traditional transportation planning is often focused on building capacity, typically in terms of roadway infrastructure, to meet anticipated demand. TDM emphasizes reducing vehicle demand, using existing resources and capacity more efficiently, redistributing demand, and building capacity for walking, biking, and transit.

TDM functions at two levels. At a policy level, TDM is a guiding principle or philosophy of how we approach transportation planning. At a practical level, TDM is a comprehensive collection of strategies and programs that might include facilities and infrastructure for walking, biking, and transit, support programs, incentives and disincentives, employer solutions, information, encouragement, and land use. The **High Occupancy Housing Specific Plan**, adopted by the City in 2018, recommends that the City establish and provide resources for a formal TDM program in order to support density, achieve mode shift, and reach the **City's climate change targets**.

Callout | TDM program elements?

Context sensitive solutions

Context sensitive solutions, or CSS, describes an approach to street design that considers the environment in which the street is located. This means that streets should look and function differently based on where they are located, and that accommodation for walking and bicycling can vary based on the character of the area. For example, pedestrian facilities on a downtown street should be more robust than a sidewalk in an industrial area. Likewise, an arterial street through a neighborhood should function differently than a street through a rural area.

A successful CSS approach must be collaborative, include multiple stakeholders, encourage flexibility in design, avoid one-size-fits-all solutions, and consider community objectives beyond the movement of vehicles.

Callout | Basic principles of a context sensitive process

- Design for all road users
- Emphasis on mobility for people and goods
- Legible design
- Equitable streets
- Streets as community places
- Early, continuous involvement of local stakeholders

Complete streets

A complete streets policy holds that streets should be designed, operated, and maintained to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. A meaningful complete streets policy involves more than just sidewalks, bike lanes, and bus stops; it means that:

- Streets always include accommodation for all users, even in temporary or interim conditions, as the default.
- Facilities for walking and bicycling are not just present, but functional and comfortable.
- Operation, maintenance, and snow removal accounts for all users, including pedestrians and bicyclists.



Photo-other | Complete street

The National Complete Streets Coalition maintains an **inventory of more than 1600 jurisdictions** that have adopted complete streets policies. Flagstaff is encouraged to document how it satisfies the 10 elements of a complete streets policy and submit for inclusion in the inventory.

Link | Smart Growth America – National Complete Streets Coalition
<https://smartgrowthamerica.org/program/national-complete-streets-coalition/>

Callout | Ten elements of a complete streets policy

- 1 Vision and intent. Includes an equitable vision for how and why the community wants to complete its streets. Specifies need to create complete, connected, network and specifies at least four modes, two of which must be biking or walking.
- 2 Diverse users. Benefits all users equitably, particularly vulnerable users and the most underinvested and underserved communities.
- 3 Commitment in all projects and phases. Applies to new, retrofit/reconstruction, maintenance, and ongoing projects.
- 4 Clear, accountable expectations. Makes any exceptions specific and sets a clear procedure that requires high-level approval and public notice prior to exceptions being granted.
- 5 Jurisdiction. Requires interagency coordination between government departments and partner agencies on Complete Streets.
- 6 Design. Directs the use of the latest and best design criteria and guidelines and sets a time frame for their implementation.

- 7 Land use and context sensitivity. **Considers the surrounding community's** current and expected land use and transportation needs.
- 8 Performance measures. Establishes performance standards that are specific, equitable, and available to the public.
- 9 Project selection criteria. Provides specific criteria to encourage funding prioritization for Complete Streets implementation.
- 10 Implementation steps. Includes specific next steps for implementation of the policy

Complete transportation

The concept of complete transportation is drawn from ADOT's [Complete Transportation Guidebook](#), a reference guide for integrating sustainable practices into transportation planning, scoping and design. Complete transportation principles include optimizing existing infrastructure, enhancing mobility choices and safety, and supporting public priorities like community character and the environment. Strategies for planning processes include defining broad measures of success, establishing a wide range of project objectives, and considering a full set of alternatives.

The process described in the guidebook is scalable; the principles and process can be used for large, complex corridor plans as well as determining an appropriate cross section for an intersection leg. The process is especially suited to retrofit projects and determining how to allocate available space to meet multiple needs.

Congestion mitigation

Transportation plans and projects **frequently cite "congestion relief" as a primary goal**; however meeting the goal of reducing congestion may not be straightforward or even feasible.

Traffic congestion on a roadway is a form of equilibrium between drivers who choose to be on the roadway and those who have made a different choice, like a different route, time, or mode. When roadway capacity is increased, it allows more drivers to choose to be on the roadway, and a new equilibrium point for congestion is established. This phenomenon has been widely studied as the concept of induced traffic, and it explains why roads that are widened are often just as congested within a few years. In the meantime, widening roads is very expensive and can have a negative impact on community character, sustainability, and walking and biking.

A more effective approach is to provide people with options for travel that are more attractive and convenient, so they have legitimate choices for avoiding congestion. Not all options will work for all people at all times; but by providing

people with safe and convenient travel options, people will be able to choose between modes based on what fits their needs. Even having a few people to change their travel behavior can make a significant difference.

The transportation system in Flagstaff has matured to a point where we need to be realistic with the community about expectations regarding congestion, and we need to have a robust discussion about how to move forward as a community with planning for our transportation system. This discussion starts with broadening our focus from moving vehicles and reducing vehicular congestion to moving people and enhancing mobility.

Traffic modeling

Traffic models help forecast future travel patterns and roadway network performance. They are frequently used to plan for future roadway capacity needs via through lanes, turn lanes, traffic signals, and other modifications. Traffic models are an essential tool for transportation planning, but they need to be used appropriately.

Traffic models are sometimes based on worst-case assumptions that overstate both future traffic volumes and future congestion. Often the response is to overbuild roadway capacity for vehicles. This response becomes self-fulfilling, because it encourages people to drive more, discourages walking and biking, and leads to increased traffic volumes.

Traffic models do not foretell the future or reveal our destiny; they illustrate a potential outcome based on a set of assumptions and a particular trajectory of vehicle use. If we work to alter that trajectory by supporting walking and biking or promoting community character, we create a future of our own choosing.

Traffic impact analysis

The City requires a traffic impact analysis (TIA) for large-scale new development to document how anticipated traffic will impact existing transportation facilities, and to plan for modifications to help mitigate those impacts. Historically, the TIA process has emphasized vehicle trips, and mitigation has been focused on expanding vehicle capacity to meet level of service (LOS) objectives. More recently, the TIA process has expanded to address walking, biking, and transit trips and to include mitigations that support these other modes of travel.

The City is also considering other revisions to further broaden the scope of TIA and formalize an expanded process. This presents an opportunity to implement a more well-rounded approach to transportation planning and to mitigate traffic impacts in ways that do not add to vehicle capacity. It also helps ensure that new development does its part to support walking, biking, and transit,

Level of service

Level of service (LOS) is the principle quantitative measure used to assess traffic flow on roadways. The LOS measure assigns letter grades of A to F, with LOS “A” indicating free-flow traffic and LOS “F” representing forced or breakdown flow. While the term “**level of service**” implies a broadly encompassing measure, LOS only measures vehicle delay. Other considerations and community values, such as safety, pedestrian and bicycle accommodation, street character, and overall mobility are not addressed.

In fact, high LOS ratings are most often associated with poor pedestrian and bicycle environments. A desirable street in an urban context – with slow-moving vehicles and lots of pedestrian activity – will have a low LOS grade. When used as a primary criterion for evaluating transportation projects, LOS promotes low-density, sprawling land use patterns and prioritizes vehicle travel over other road users. Given the disconnect between LOS and other community goals for transportation, LOS should not be considered as a primary or sole measure.

Transit planning

A transit trip is door-to-door, not just stop-to-stop. Fully connected and comfortably designed pedestrian and bicycle networks are an indispensable precursor to a robust transit system. Transit reaches its greatest potential in walkable, well-connected places. Connecting walking and biking facilities with transit stops helps increase the area that transit serves and ensures access to transit for everyone.

- Transit oriented development. Transit oriented development (TOD) describes dense, compact, mixed-use development centered around transit stops. At a community level, TOD encourages land use patterns that cluster higher-density activity centers near transit stops and lines. At a site level, TOD incorporates site design principles such as direct walkways, frequent crossings, and walkable streets to strengthen pedestrian access between the development and the transit stop.

[Link | Transit oriented design \(TBD\)](#)

- First/last mile. This concept refers to the connections transit riders need to make at either end of a transit trip, like getting from home to the bus stop at one end and getting from the bus stop to their destination at the other end.

For short distances, typically within a quarter-mile, walking is a viable option for first/last mile connections to a bus stop. However, if sidewalks and crossings are not present, or if the pedestrian environment feels unpleasant or unsafe, then even a quarter mile walk may be too far. On the other hand, in exemplary pedestrian environments with complete facilities, transit patrons will be willing to walk further to access transit.

Bicycling to transit can significantly extend the distance patrons are willing to travel to get to a bus stop, but only if complete and comfortable biking

networks that connect to the stop are available. A bike-sharing system is important, because it allows transit riders to access transit by bike without owning a bike. Secure bike parking, especially long-term parking, at the station or destination is also an essential component of biking to transit.

Planning for the continuity of walking and biking networks is necessary in the vicinity of transit stops, but it needs to be at a smaller scale than community-wide networks and in greater detail.

- Permanent transit network. **Mountain Line's** [Five-Year Transit Plan](#) establishes a Permanent Transit Network (PTN), which comprises a series of street corridors where Mountain Line has made its strongest commitment to providing transit service. The PTN also provides an opportunity to focus on transit-supportive practices, such as zoning and land use, street design, infrastructure, and private investment. Pedestrian and bicycle facilities along and near PTN corridors can also be identified and prioritized.

Map | permanent transit network

Pedestrian friendliness scale

This table lists a variety of factors that influence how pedestrian friendly a place is, and provides values or measures for each factor along a continuum from least to most accommodating of pedestrians. This information is useful for context-based pedestrian planning; in an industrial area, **"Pedestrian Tolerant"** may be sufficient, while in the core of an urban activity center our goal should be a **"Pedestrian Place"**. **The information in this table can serve as a basis for future guidelines and standards for pedestrian facilities.**

Table 8.X Pedestrian friendly scale				
	Pedestrian Intolerant	Pedestrian Tolerant	Pedestrian Supportive	Pedestrian Place
Goal	No place should be Pedestrian Intolerant	Every place should be at least Pedestrian Tolerant	Most places should be Pedestrian Supportive	A few locations should be Pedestrian Places
Roadway characteristics				
Traffic volumes (ADT)	>25000	15000 - 25000	5000 - 15000	<5000
Traffic speeds	>35 mph	30-35 mph	25-30 mph	<25 mph
On-street parking	None	None	One side	Both sides
Bicycle lanes	None	Some	Both sides	Protected
Curbs	None	Roll	Vertical	Vertical
Lanes to cross at once	More than 5	5	3 or 4	No more than 2
Turn lanes	Frequent	Some	Rare	None
Median	TWLT	Raised	Landscaped	Landscaped
Curb radii	>30 ft	25-30 ft	15-25 ft	5-15 ft

Traffic signal cycles	Long cycles	Medium cycles	Short cycles	Short cycles
Signal walk phase	None	Timed at 3.5-4.0 ft/sec	Timed at 2.5-3.0 ft/sec	Lead ped interval or exclusive ped phase
Push buttons	None	Ped actuated	Ped actuated Ped recall	Ped recall
Crosswalks	None	Marked	High visibility	Enhanced
Crossing frequency	>1320 ft	660-1320 ft	330-660 ft	150-330ft
Mid-block crossings	None	Marked, signed	Curb extensions Refuge islands	Enhanced Beacon
Bus pull-outs	Frequent	Some	Rare	None
Pedestrian realm				
Sidewalk presence	None	One side	Both sides	Both sides
Sidewalk through width	<5 ft	5-6 ft	6-8 ft	8-10 ft
Parkway width	None	<5 ft	5 ft	>5 ft
Street trees	None	None	Every 25-50 ft	Every 25 ft
Furnishings	None	None	Some	Frequent
Transit stops	Sign	Bench	Shelter	Enhanced
Wayfinding	None	None	Some	Throughout
Lighting	None	Roadway	Roadway Pedestrian	Pedestrian
Adjacent land use				
Land use mix	Single-use	Mostly single-use	Some mixed-use	Mixed-use
Building setbacks	>50 ft	25-50 ft	10-25 ft	>10 ft
Building height	1 story	1-2 stories	3-4 stories	3-5 stories
Height to width ratio	>1:4	1:4 to 1:2	1:2	1:2 to 1:1
Door and windows on street	None	Rare	Some	Frequent
Pedestrian protection	None	None	Awning/canopy over entrances	Continuous awnings or arcade
Off-street parking	Large fields in front	Small fields in front	Small fields to side or rear	Structured
Frontage zone	None	Landscape buffer between sidewalk and parking	Landscape buffer between sidewalk and building	Streetscaping outdoor activity
Screening walls	Frequent	Some	Rare	None
Ped access from street	None	Sidewalk through parking lot	Enhanced sidewalk or direct access	Direct, inviting entries
Ped access frequency	None	>330 ft	150-330 ft	<150 ft

Equity

Low-income neighborhoods, communities of color, and other traditionally disadvantaged populations and groups tend to be underrepresented in transportation planning processes. However, these are the same populations and groups that are often disparately affected by the outcomes of transportation

planning, particularly in regard to mobility and reliance on walking, biking, and transit.

A number of steps can be taken to work towards equity in transportation planning:

- **Build relationships.** Establish connections and build working relationships with relevant communities, neighborhoods, groups, and individuals in advance so there is already a relationship in place when support and assistance is needed.
- **Let communities lead.** Local communities and groups have the best understanding and perspective of their situation, including their unique barriers to walking and biking. It is important to listen and learn from them, give value to their contributions, and share decision making authority with them.
- **Evaluate and measure.** Establish a practice of conducting routine equity analyses for transportation plans and programs will ensure that equity considerations are part of the process and addressed. Geographic reviews of planned investments and enhancements, in addition to current conditions, will reveal any disparate impacts to low-income neighborhoods and other communities.
- **Frame the issues.** The benefits of walking and biking may not be universally understood, and there may be a perception within disadvantaged communities that active transportation is not relevant to them. The benefits should be expressed and understood in ways that are meaningful to the community, including demonstrating how walking and biking enhance mobility and protect and promote community interests.
- **Intentional outreach.** Outreach efforts must be concerted and intentional to reach populations and communities that do not typically participate in transportation planning processes. Engagement should start early and be consistent throughout the process. We must bring meaningful opportunities for participation and engagement to the community, instead of expecting them to come to us.
- **Build capacity.** Create opportunities that encourage the development of leadership and participation within disadvantaged communities and groups.
- **Recruit participation.** Include representatives from underserved communities and populations to serve on the Pedestrian Advisory Committee, Bicycle Advisory Committee, and Transportation Commission. This effort needs to be backed with a foundation of long term and committed engagement, so representation does not become tokenism.

Universal design

Universal design makes walking and biking facilities accessible to all people, regardless of age, ability, or situation without the need for special adaptation. There are a number of other terms for universal design, including design-for-all, inclusive design, and barrier-free design, but all refer to the same core principles.

Universal design is intended to serve all users. In Flagstaff, American Community Survey statistics indicate that one out of every 11 residents has some form of disability. This is a significant segment of the population that benefits directly from universal design. Other beneficiaries include children, elderly people, people with mobility challenges that do not meet the formal definition of disabled, people with temporary conditions such as a broken leg or sprained ankle, or people with strollers. Universal design benefits all users.

Call-out | Principles of universal design

Principles of universal design

- Equitable use
- Flexibility in use
- Simple and intuitive
- Perceptible information
- Tolerance for error
- Low physical effort
- Size and space for approach and use

Some examples of universal design in walking and biking:

- Curb cuts are essential for wheelchair accessibility, but they also benefit all pedestrians.
- FUTS trails with moderate slopes and a firm, compacted surface to accommodate wheelchair use.
- Interpretive signing along FUTS at a height that can be read by adults, children, and people in wheelchairs.
- **Accessible pedestrian signals, which indicate walk/don't walk** intervals in audible and visual formats.
- Detailed information for trails – such as grades, slopes, surface material, and length – so users can decide for themselves if they want to hike it.
- Neighborhood maps that show accessible routes and where sidewalks and crossings are present.
- Access to new transportation technologies, such as bike share, that does not require a smart phone or credit card.

- Pedestrian push buttons at a height reachable by everyone that do not require much pressure to push.
- Buses that “kneel” for boarding by hydraulically lowering the floor to make it easier to enter or exit.
- Clearing snow and ice from sidewalks; blocked sidewalks are problematic for everyone, but exponentially worse for people with disabilities and people who rely on walking, biking, and transit.

Accessibility

The Americans with Disabilities Act (ADA) is a federal civil rights law that prohibits discrimination on the basis of disability. For purposes of the law, a disability is defined as a physical or mental impairment, either permanent or temporary, that substantially limits one or more major life activities. ADA became law in 1990 and was amended in 2008 to broaden the definition of disability and extend protections to more people.

In the 30 years since ADA became law, several sets of standards and guidelines have been adopted or published. Most include some provisions for pedestrian facilities and accommodation:

- ADA Accessibility Guidelines (ADAAG). Guidelines developed and maintained by the US Access Board. The guidelines apply primarily to buildings and building sites, but there are a number of provisions for sidewalks and accessible routes that address basic elements including running slope, cross slope, obstructions, and curb ramps. First developed in 1991, ADAAG has been supplemented several times since, most recently in 2002.

Link | <https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/background/adaag>

- ADA Standards for Accessible Design. These standards were issued by the Department of Transportation in 2006 for transportation facilities and by the Department of Justice in 2010. The standards are based on and very similar to ADAAG, but they are enforceable standards rather than guidelines.

Link | <https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/ada-standards>

- Public right-of-way accessibility guidelines (PROWAG). Guidelines developed by the Access Board to specifically address sidewalks and other pedestrian facilities in the public right-of-way. The guidelines were first published in 2011 and have received considerable review, but they were never formally adopted as standards. As a result, they serve as a guide for “best practices” for pedestrian accommodation.

Link | <https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/proposed-rights-of-way-guidelines>

- Shared use path accessibility guidelines. A proposed supplement to PROWAG that is specific to paths designed for use by pedestrians and bicyclists for transportation and recreational use. The guidelines were released by the Access Board in 2013 for public comment, but they have not been adopted.

Link | <https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/shared-use-paths/supplemental-notice>

Maintenance

Maintaining facilities is just as important as building them. Cracked sidewalks, faded bike lane markings, and eroded FUTS trails discourage their use and can create safety hazards. However, resources needed for maintenance often compete with many other municipal needs, and it can be challenging to make an effective case to decision makers when asking for additional maintenance resources.

The first line of defense for maintenance is to build facilities that require less on-going maintenance by design. Building a FUTS trails with good drainage features, for example, reduces the need to repair future erosion problems.

Ultimately, it may come down to policy choices about resource allocation and making a decision to dedicate adequate funds for maintenance. In that circumstance, it is vital to have good information about quantities, practices, standards, and costs to effectively make the case for the need.

Snow removal

Although Flagstaff sometimes gets heavy snowfalls, a good part of the winter is clear, dry, reasonably warm, and viable for bicycling and walking. However, when snow is left on or plowed into bike lanes and sidewalks, it can form an ice pack that tends to remain long after the adjoining street is clear and dry. This discourages walking and biking, can create dangerous conditions, and hampers mobility for a significant portion of the population.

The use of cinders on streets during snow events makes it challenging to keep bike lanes clear through the winter and spring. Cinders also accumulate on sidewalks, in some cases lasting for months and in sufficient quantities to make the sidewalk unusable.

Closures and detours

Closure of sidewalks, bike lanes, and FUTS facilities due to construction, repairs, utility work, and other activities is inevitable. However, how closures are managed makes a significant and visible difference in how well we are accommodating pedestrians and bicyclists overall. The following principles should be used to guide closures:

- Close walking and biking facilities only when necessary; the first effort should be finding a way to keep the facility open.
- Consider the safety and comfort of pedestrians and bicyclists ahead of the convenience of contractors.
- **Limit the scope of closures; for example don't close a long section of sidewalk to replace a single panel.**
- Limit the duration of closures to only the time needed for work that affects the facility; re-open pedestrian and bike routes as soon as possible.
- Provide alternate routes and detours to maintain connectivity during closures.
- Use context and the hierarchy of facilities to guide closures; well-used or important routes should have greater urgency to keep open.
- Keep the public informed before and during closures using signing on-site, **the City's website, social media, and press releases to disseminate** information. Reliable information helps engender public trust and goodwill.

Land use and urban form

Land use

Patterns of land use, development, and growth are fundamental determinants for walkable and bikeable environments. Compact, dense, mixed-use development patterns support walking and biking, while sprawling, low-density, segregated-use patterns encourage vehicle use and are not conducive to travel on foot or bicycle.

- **Compact form.** Infill development, as opposed to growth at the periphery of the community, uses existing resources and infrastructure more efficiently, keeps distances short for walking and biking, and helps keep neighborhoods at a human scale.
- **Density.** Means more residences, shops, services, and jobs are clustered in a compact geographic area, which reduces travel distances creates more opportunities for walking and biking.

- Mixed use. A diversity of uses in proximity makes it possible to walk or bike for daily needs; for example, biking to work or school, walking around the corner to get lunch, or making a short bike ride to an appointment.

The **Trip Diary Survey** provides empirical evidence of the relationship between land use patterns and walking and biking. In Flagstaff's core area, almost 60 percent of trips are made by walking, biking, or transit. The core area includes Downtown, Southside, and the NAU campus, and generally comprises compact, dense, mixed-use land use patterns. In the rest of the Flagstaff, only 11 percent of trips are made by walking, biking, or transit. Much of Flagstaff outside of the core area are suburban in character; development is typically low-density, and vehicle movement and parking are emphasized.

Graphic | Mode share for core and rest of Flagstaff

Flagstaff is fairly compact by nature. Most of the community is within a bikeable distance and significant portions are within a walkable area. About 80 percent of bicycle trips in Flagstaff are less than 2.5 miles in length, and 53 percent of walking trips are less than a mile.

Compact, dense land use patterns have other social, economic, and environmental benefits as well, and there is a growing public preference for urban neighborhoods that are active, vibrant, walkable and bicycle friendly.

Becoming more dense, mixed use, and compact is one of the most effective ways to support walking and biking, but it is also one of the slowest to implement. Transformation from suburban to urban land use patterns occurs over years and can take decades. However, every new development and redevelopment is an opportunity for Flagstaff to move in that direction.

Urban design

Urban design elements like streetscape design, building orientation, and architecture fundamentally affect the pedestrian and bicycle environment. Most people – pedestrians and bicyclists included – respond positively to active, engaging, interesting, and pleasant streets, buildings, and streetscapes.

Urban design can also significantly impact the perception of distance; people are much more willing to walk or bike longer distances if the area they are traveling through is interesting and appealing.

Some urban design elements that most directly affect walking and biking include:

- Setbacks. Buildings that are set closer to the street help enclose the street and maintain a human scale more inviting to pedestrians. Smaller building setbacks also place building activity closer to the street, making it easier to access the building from the street.

- Frontage zone. Though smaller setbacks can be beneficial, buildings do not need to be right up to the sidewalk; providing a nominal setback for the sidewalk frontage zone creates space for streetscaping, landscaping, plazas, outdoor dining and sales, and other activity.
- Orientation. Orienting building activity towards the street helps support an active and engaged street environment for pedestrians.
- Facades. Visual interest along building facades is important to the pedestrian and bicycle environment. Features such as windows, storefronts, awnings, entries, and porches add to the pedestrian environment, while long blank walls detract from it.
- Parking lots. Parking located in front of buildings and along the street creates expanses with little interest or appeal to pedestrians, even when they are landscaped or screened. Larger parking lots are more detrimental. Parking to the side or rear of buildings helps mitigate the negative impacts.

Urban design considerations are typically thought of as relevant to urban contexts, but the principles are readily adaptable to suburban environments as well. In many ways design is even more imperative in suburban environments to overcome the negative effects that low-density, sprawling development, and isolated land uses have on walking and biking. Suburban areas may be more difficult to transform into truly walkable urban places, but there is still much that can be done to enhance walkability and bicycle friendliness overall.

Parking

Vehicular parking often works against walking and biking in a number of ways:

- Parking lots can take up large areas of land, especially in suburban areas, which makes it difficult to have density and compact form and the benefits that go with them.
- Abundant parking serves as an encouragement to drive.
- Parking lots at the front of a building create a barrier for pedestrians between the building and the street that is challenging, and sometimes unsafe, to cross.
- Large parking lots make it difficult to enclose the street and maintain a pedestrian or human scale.
- Parking lots have little interest or appeal to pedestrians, and do not add to street character, even when they are landscaped or screened.

Photo | large parking lot

Parking has become a difficult community conversation in Flagstaff. There is an uneasiness with the idea of providing less parking and a concern that parking will not be convenient or available when it is needed.

In light of recent proposals for large development projects, including student housing, the Flagstaff public has regularly expressed concerns about the potential negative consequences of too little parking. An inadequate supply of parking is perceived to cause a several problems, including blocked driveways, parking on sidewalks, vehicles in landscape areas, and other forms of illegal parking. There is also a more general, less well-defined apprehension regarding neighborhood outsiders using on-street parking in residential neighborhoods.

In the Downtown and Southside areas of Flagstaff, on-street parking spaces have become somewhat sacrosanct. Proposals to remove on-street parking in these areas typically generate concern and opposition, even when they would be removed for alternate uses like outdoor dining, bicycle parking, and streetscaping.

Flagstaff's Zoning Code, which regulates the number of off-street parking that must be provided with new development, indicates both a minimum and maximum number. The standards require a minimum number of off-street spaces for each development, based on the proposed use and density. The standards also indicate a maximum; that off-street parking spaces cannot exceed 105 percent of the number required, unless those spaces are provided in a multi-storage structure rather than in surface lots.

There are a number of considerations to manage the demand for parking and to help mitigate its impacts:

- More streets should be considered as candidates for on-street parking. Not only does this provide an additional buffer for pedestrians, but it reduces the demand for on-site parking lots.
- Provide more options and incentives for shared parking adjoining parcels and uses, so parking demand can be averaged across a larger area.
- Build a parking structure in Downtown or the Southside. While expensive, it would partially alleviate community opposition to converting on-street spaces to other purposes that contribute to the character of Downtown and Southside and create opportunities for civic spaces and other projects that increase the
- **"Unbundle" parking costs by charging fees for parking at** private development, including parking fees that are separate from rent in residential projects, especially in urban areas and activity centers. No parking is free, but it is subsidized unless a fee is charged.

- Adopt incentives and requirements for measures that reduce demand for parking, such as bike share, enhanced bike parking, transit passes, and car share options.
- Amend the Zoning Code to reduce minimum parking requirements for new development in urban areas and activity centers as compared to suburban areas.
- Review and revise current parking standards in the Zoning Code to better match actual demand.

Area types

The Regional Plan describes three different area types – urban, suburban, and rural – to help define the character of existing development and plan for future growth and development. Area types are also useful for defining the context and planning for pedestrian and bicycle infrastructure.

Urban area type

Land use in urban areas is denser, more compact and made up of a mix of land uses. This area type includes older, historic areas like Downtown and the Southside that were developed prior to the automobile and contribute to **Flagstaff's** unique character.

Urban areas are the most walkable and bikeable due to their density, compact form, and a tight grid street pattern. Streets tend to be more narrow, slower, and more inviting, although there is also less space for walking and biking facilities.

Some considerations for pedestrian and bicycle planning in urban areas:

- In urban areas walking and biking accommodation should always be favored over automobile travel, especially when there is limited room in the right-of-way and competition for space.
- Bicyclists and motor vehicles tend to share local streets in urban areas; as a result, collector and arterial streets through urban areas become important corridors for biking and vital links in the bikeways network.
- There is a tendency to impose suburban, one-size-fits-all street standards on collector and arterial streets through urban areas to transform them into wide, fast, suburban-style streets; this should be resisted.
- Urban areas are ideal locations to use a placemaking approach to enhance the walking and biking environment by supporting gathering places, public art, streetscaping, and landscaping.

- There is generally less space available for FUTS and off-street bikeway corridors in urban areas; however, it is possible to find opportunities for FUTS and bikeways with careful planning. Narrow, tight corridors are appropriate in an urban setting, but require additional attention to detail to make them work. On-street links between trail segments may also be necessary.
- Wants a tighter grid. Pedestria

Photo | somewhere downtown

Suburban area type

Suburban land use patterns, which began with post-war development of the 1950s, emphasize automobile travel via wide roads and abundant parking. Suburban areas are less conducive to walking and biking because they were typically planned for automobiles. Streets are hierarchical from local to arterial, so those most useful for travel are the widest, fastest, and busiest. Land use is less dense and more segregated into homogenous uses. Block sizes can be very large, and the street grid disconnected, which reduces options for walking and biking. Isolated land uses also work against walking and biking connectivity.

Suburban areas require a concerted effort to make them more pedestrian and bicycle friendly. However, there is often a tendency to continue planning practices and development patterns that favor automobiles and disregard opportunities for walking and biking.

Some considerations for pedestrian and bicycle planning in suburban areas:

- Over time, land use patterns can be transformed to become more dense, compact, and mixed use. Transformations can be concentrated in activity centers (see **“Place Types”** section below).
- Planning efforts should also concentrate on transforming streets to be less automobile dominated, and more like complete streets and community places.
- To compensate for wide, fast streets, higher-level facilities are needed for walking and biking, like additional buffering for sidewalks and protection or separation for bicycle facilities.
- There is a greater imperative to provide public spaces, streetscape elements, and landscaping because they are often lacking, and arterial and collector street character creates a greater need for them.
- FUTS trails can follow the open space and greenway network and create a shadow transportation network for walking and biking that is separate from the street system. Greenways and open space also help define neighborhoods.

- Because street patterns in suburban areas tend to form very large blocks, additional pedestrian and bicycle corridors and connections are needed to create a tighter and more connected grid than is afforded by the street network. Similarly, better pedestrian and bicycle access is needed between adjoining uses, between neighborhoods, and between residential and commercial areas.

Photo | typical suburban landscape

Rural area type

This area type is generally found outside of the city, and is defined by very large lots and very low-density residential neighborhoods. Most **of Flagstaff's outlying** communities fall into this category, but only a few areas within City limits are considered part of the rural area type. Existing streets in rural areas typically provide little or no accommodation for walking and biking. Additionally, roadway connections between Flagstaff and outlying communities are often highways which are not conducive to walking and biking.

Addressing pedestrian and bicycle infrastructure in rural neighborhoods is outside of the scope of this master plan. However, there is an opportunity to explore dedicated facilities – sidewalks, bike lanes, FUTS trails – for pedestrian and bicycle travel between Flagstaff and outlying communities.

Some considerations for pedestrian and bicycle planning in suburban areas:

- Local public streets in rural areas should provide sidewalks as a minimum accommodation for pedestrians.
- Collector and arterial roadways through rural areas should always accommodate pedestrians and bicyclists, including sidewalks and bike lanes or bikeways.
- Planned or existing FUTS trails may help give pedestrian and bicycle access to more remote rural areas within City limits.
- The potential for pedestrian and bicycle connections to outlying communities is discussed in the FUTS section of Chapter 7.

Map | area types and activity centers

Place types

The Regional Plan also identifies three different place types – activity centers, neighborhoods, and corridors – within each area type.

- Activity centers. These are locations appropriate for clusters of mixed-use, compact, dense development or redevelopment. The area included within an activity center is defined by a quarter-mile pedestrian shed, based on a five-minute walking distance. Activity centers are categorized by both context (urban, suburban, or rural) and scale (regional or neighborhood).

Activity centers represent areas where land use and development patterns can be transformed over time to support walking, biking, and transit; and where there is an opportunity for enhanced pedestrian and bicycle accommodation.

- Neighborhoods. Are defined as mostly residential areas, held together by development patterns and street connections, and bounded by major streets and topography.
- Corridors. Refer to linear commercial areas along major streets. Planning for corridors follows the principles of Great Streets, as defined below.

NAU campus

In this discussion of land use and urban form, the Northern Arizona University (NAU) campus warrants special consideration. NAU is the most substantial generator and attractor of travel trips in Flagstaff, by a considerable margin. By extension, this means that it also has the most opportunity for walking and biking trips.

The NAU campus is centrally located and part of **Flagstaff's** core, along with Downtown and Southside. This creates enhanced potential for walking and biking, and it means the campus occupies a prominent space in our overall pedestrian, bicycle, and FUTS network.

Some considerations for walking and biking on the NAU campus:

- NAU trips represent our greatest opportunity to convert driving trips to walking, biking and transit trips.
- Multiple, convenient, non-motorized points of access between the campus and the community are needed better facilitate walking and biking.
- Accommodating pedestrian and bicycle travel through campus is also important. For bicyclists travelling from southern neighborhoods to Downtown, the best travel routes go through campus.

NAU is a separate governmental entity and outside of City jurisdiction, which makes cooperation and coordination with NAU paramount to any pedestrian and bicycle efforts.

Great Streets

The Great Streets concept, as described in the Regional Plan, consider Flagstaff's main corridors more comprehensively from both a transportation and community character perspective. Flagstaff's Regional Plan describes Great Streets in this way:

Streets are more than just linear physical spaces that permit automobiles to get from here to there. Great street design balances the need to move traffic with other community goals and modes of travel – where a mix of automobiles, bicycles, pedestrians, homes, and businesses is the pulse of civic activity and the street itself is a public space to use and enjoy.

Callout | Great Streets in Flagstaff

Five corridors in Flagstaff identified in Regional Plan as Great Streets:

- Milton Road
- Route 66
- Fourth Street
- Fort Valley Road
- Humphreys Street
- Highway 89
- Cedar Avenue – Forest Avenue
- Butler Avenue – Huntington Drive

Beyond the Regional Plan definition, a distillation of information from other sources yields these fundamental characteristics for Great Streets:

- Traffic is managed: traffic speeds are reduced, width is limited, congestion is expected.
- High level of service for all modes: walking, biking, and transit are all supported.
- Multiple street functions are balanced: the movement of vehicles is balanced with other modes of travel and other community goals.
- The street functions as public space: public art, streetscape elements, seating areas, and civic space are present.
- There is activity and interaction: the street is activated, vibrant and dynamic, there is a reason to be there and stay there.
- **The street is unique: it reflects Flagstaff's history**, culture, and values and its place in the neighborhood and the community.

References:

<https://www.strongtowns.org/journal/2017/3/24/how-to-build-great-streets>
<https://www.pps.org/article/8-principles-streets-as-places>

<https://nacto.org/publication/urban-street-design-guide/streets/street-design-principles/>
<http://www.ourlivingstreets.com/>

Placemaking

Placemaking describes a process of transforming the public realm into quality places for people. Placemaking strengthens the connection between people and the places they live and helps create public spaces that contribute to community character, well-being, and happiness. Urban design, art, landscaping, and amenities are all aspects of placemaking.

Streets are our most fundamental and ubiquitous shared public space and consequently have tremendous potential for placemaking. However, we generally think of them in functional terms and primarily for cars, parking, and movement of goods. Historically, streets served a variety of community functions; recreation, conversation, celebration, protest, gathering, interaction, shopping, performance, culture, art, and lingering.

Pedestrian and bicycle facilities are both elements of placemaking and greatly enhanced by placemaking. Walking and biking function at a human scale, so small, local placemaking gestures in conjunction with pedestrian and bicycle networks are often the most meaningful.

Resource:

<https://www.pps.org/article/what-is-placemaking>

Generators and attractors

Generators and attractors describe places and land uses that encourage walking and bicycling trips. Map 8.X on the following page is a composite map of the generators and attractors listed below. It helps illustrate where higher levels of walking and biking can be expected, and is used in this document to help prioritize walking and biking infrastructure.

- Schools
- Parks
- Transit stops
- Residential neighborhoods
- Commercial areas
- Employment centers
- Institutions
- NAU and CCC campuses

Map | Attractors and generators of walking and biking

Social factors

Social factors describe circumstances that make people more likely to walk or bike, and address traditionally underserved populations that would benefit from enhanced mobility. Like generators and attractors, social factors are an important component in the prioritization process. Map 8.X on page X depicts a composite of the following social factors:

- Elderly populations aged 65 and over
- Children under the age of 18
- Persons with disabilities
- Household poverty status
- Households without access to a vehicle
- Assisted housing sites
- Social service facilities

Map | Social factors for walking and biking

8 Design guidelines

Street design

The character of streets is a significant determinant of pedestrian and bicycle friendliness, beyond just the provision of basic facilities like sidewalks and bike lanes.

Our concept of a pedestrian friendly street is typically a small, intimate street with open-air shops along the edge, outdoor seating and dining, plenty of pedestrian activity, and few cars. In reality, while this type of streetscape is appropriate and desirable in a few locations, it is not possible or even necessary everywhere.

Most of our streets have a different context, especially collector and arterial level roadways, and especially streets in a suburban context. How we make them pedestrian and bicycle friendly will vary but just as vital.

In some ways, working to make streets in a suburban context more accommodating of walking and biking – where multiple elements work against it – is even more important than creating a few pedestrian places in urban contexts. To the extent we can make those places walkable and bikeable, we enhance pedestrian and bicycle friendliness for the whole community.

Photo-other | pedestrian place

Right-sizing

Right-sizing refers to the principle of planning for streets that are not wider than the need to be. Wide streets are detrimental for a number of reasons:

- Increase crossing distance and potential conflicts and makes crossing less safe.
- Encourage speeding.
- Are less comfortable and more intimidating for walking and biking, both for crossing and travelling along the street.
- Can be detrimental to community character, and make it difficult to create appealing places.
- Add to the **City's** obligation for maintenance.
- Create barriers through the middle of neighborhoods and the community.

Travel lanes

In Flagstaff, planning for most arterials and major collector streets default to a five-lane cross-section, which includes two travel lanes in each direction plus a center two-way left turn lane. Some streets, like Milton Road, are considered candidates for even more lanes.

Additional lanes are intended to add capacity to a roadway to accommodate increases in traffic and relieve congestion, even though this is often not the result. The decision to add lanes, however, is rarely weighed against other considerations such as safety for vulnerable users or community character.



Photo | wide road – Route 66

Lane width

The City's standard for lane width is 11 feet, except for designated truck routes, which are 12 feet. Because most arterial streets and many collectors are designated as truck routes, the default minimum is effectively 12 feet for most major streets. However, lane widths of 12 feet are unnecessary for most city streets. As a result, the current standard should be revised to set 11 feet as a maximum, and to allow for 10 foot lanes in suitable situations.

Some major arterial streets in Flagstaff use 11-foot lanes without adverse consequence, including all of Route 66, Fort Valley Road, and the north end of Milton Road. A number of other arterial and collector streets already have lane widths of less than 11 feet.

Turn lanes

Left and right-turn lanes are frequently added on to major streets at driveways and side streets. The justification is typically that turn lanes aid the flow of traffic, keep through vehicles from having to slow for turning vehicles, and reduce the incidence of rear-end crashes. This concept includes bus pull outs, which removes buses from the street during boarding and alighting.

However, turn lanes can also create problems for walking and biking. Turn lanes increase roadway width, and in some cases dramatically increase the size of intersections, making it less comfortable and in some cases less safe to cross. Turn lanes also increase the speed of through vehicles.

Photo | Route 66/Fourth intersection

Guidelines for right-sizing streets

- Before additional travel lanes are added to any street section, there should be a thorough consideration of options and trade-offs, including whether additional lanes are justified by a realistic projection of future traffic volumes, if other options to increase capacity have been considered, whether the context is suitable for a wide road, and if the adverse impacts outweigh the benefits.
- When additional lanes are planned, mitigations for pedestrian and bicycle accommodation need to be included, such as extra buffers for pedestrians, protected or separated bike lanes, raised landscape median, frequent crossings, and reduced reliance on turn lanes and bus pull-outs
- Lane width should not exceed 11 feet for most arterial and collector roadways, and there are situations where 10 feet is adequate.
- Extra width in the right-of-way is better used for bike lanes, buffered and protected bike lanes, wider sidewalks, and parkways than for wider travel lanes.
- The use of turn lanes may be appropriate for highways and other high-speed roadways, but on city streets should be used sparingly in suburban contexts and almost never in urban settings.
- Warrants for turn lanes are based almost solely on the number of turning vehicles. However, a more thorough decision matrix would account for pedestrian and bicycle impacts, as well as other community goals.

Speed management

Slowing vehicular traffic speeds are likely the single most effective way to enhance safety for all road users, especially vulnerable users. Slower speeds reduce the likelihood of crashes, by increasing **driver's reaction time, decreasing braking distance, and expanding a driver's cone of vision**. Slower speeds also

reduce the severity of crashes. A pedestrian struck by a vehicle at 40 mph has a 20 percent chance of survival; but at 20 mph their survival rate increases to 80 percent.

Slower speeds are also essential to creating streets that are more comfortable for walking and biking, less intimidating, easier and safer to cross, less of a community barrier, and more of a community place.

Speed management techniques

Roadway design, character, and context elements can be the most effective techniques for managing speed:

- Allow on-street parking on more arterial and collector streets. This also helps reduce the need for large parking fields on private parcels.
- Keep streets from being overbuilt with extra lanes and wider-than-needed lane widths.
- Add turn lanes and bus pull-outs sparingly, and where they are used, design them to be slow speed.
- Include regular crossings for pedestrians and bicyclists, including flashing beacons and enhanced crossings.
- Incorporate streetscaping, including street trees, into roadway design.
- Street geometry, curves, and alignments should be based on slower speeds. Requirements for expansive sight triangles promote faster speeds.
- Use bump-outs, neckdowns, and median islands.
- Provide visual clues in the street design for transitions from one context to another, such that drivers feel like they should slow down when the street enters a neighborhood.
- Design intersections and roundabouts to encourage slower speeds and more attentiveness of drivers.
- Include enhanced bicycle facilities along the edges of the street, like buffered and protected bike lanes.
- Encourage pedestrian and bicycle activity. Drivers are more mindful of walkers and bikers when they expect to encounter them.
- Place buildings, outdoor areas, community space, and other activities close to the street.

Guidelines for speed management

- Speed management techniques should be incorporated into the design of all new roadways, including arterial and collector streets. Speed management can also be used in retrofit situations.
- Higher speeds do not necessarily increase roadway capacity; in fact roadway capacity diminishes at higher speeds. Time spent waiting for signals is more of a determinant of overall travel time than travel speed on segments between intersections.
- Environmental clues, like street design, character, and context, are more important factors in determining vehicle speed along a street than the posted speed limit. Drivers will tend to drive as fast as feels comfortable, regardless of the posted speed limit.
- Where speed management is effective, the posted speed limit matches both the design and target speed for a street. When the design speed includes a safety buffer for the incautious driver, it is more difficult to manage speeds.
- In urban areas, urban form and street design likely already work to slow traffic. For these streets it is important not to introduce design elements intended for higher-speed roadways.
- In suburban areas, context and street design already work against effective speed management. In this circumstance, introducing urban land use and street features helps with speed management.
- While street design is the most effective factor in speed management, other speed management programs can help support and form a more comprehensive approach. Typical programs include enhanced and targeted enforcement, education and outreach, speed feedback signs and speed trailers, and citizen watch programs.
- The City has a **neighborhood traffic management program** references a number of traffic calming features for local residential streets. These measures can be an integral part of local street design for new residential subdivisions.

Street connectivity

The pattern of streets in the community, and the resulting pedestrian and bicycle grid, is another important determinant for the pedestrian and bicycle environment.

There are two archetypes that describe the pattern of street networks, representing opposite ends of a spectrum. In reality, most street networks are some version of a hybrid between the two:

- Traditional grid is the regular pattern of intersecting north-south and east-west streets, found across the country in areas developed around the turn of the last century. The pattern is characterized by a high density of streets, frequent intersections, and small block sizes.

It has several advantages for walking and biking, including allowing multiple routes and options for walking and biking, and reducing distances and out-of-direction travel.

- Loops-and-lollipops describes the suburban post-war street pattern that features curvilinear alignments, large blocks, few intersections, and abundant cul-de-sacs. The road system is hierarchical, which means that local streets feed collector streets, and collector streets feed arterial roads.

This pattern works against walking and biking in a number of ways: large block sizes and circuitous street patterns limit route options for walking and biking and require out-of-direction travel, and the hierarchical street pattern can force pedestrians and bicyclists onto wider, faster, busier arterial streets that are not comfortable and difficult to cross.

Graphic | traditional grid vs loops-and-lollipops street network

A traditional grid is therefore the favored street pattern for pedestrian and bicycle accommodation. Regardless of the street network, it is possible and often desirable to create a pedestrian and bicycle grid that varies from the street grid and provides a higher degree of connectivity for walking and biking.

Guidelines for connectivity

- Suitable densities for pedestrian and bicycle grids can vary by context. In urban areas and activity centers, grid spacing should be no more than 300 feet. In a suburban context, the grid can range up to 600 feet.
- In downtown Flagstaff, the street grid creates block faces of about 350 feet in length. However, most blocks include public alleys in one or both directions, which are frequently used and an important component of the Downtown pedestrian network. As a result, an effective grid spacing of about 175 feet exists downtown. In the interest of pedestrian accommodation, it is important to acknowledge and protect this grid. Alleys should never be closed to pedestrian traffic or abandoned, and marked crosswalks are recommended at all alley locations.

Map | downtown pedestrian grid

- To counteract the effects of large block sizes and abundant cul-de-sacs, incorporate paseos or non-motorized pass-throughs create a tighter pedestrian and bicycle grid.

- Plan for regular and frequent pedestrian and bicycle connections between adjoining developments, even when street connections are limited.
- Use FUTS trails along greenways through neighborhoods to enhance walking and biking routes.
- Provide pedestrian and bicycle access ways between residential neighborhoods and commercial areas and other non-residential attractors. For example, a wide sidewalk connection can be used to connect a shopping center with the neighborhood behind it.
- Street crossings are an essential element of the non-motorized grid. Major roads with few crossings interrupt the grid and create a barrier to pedestrian and bicycle travel. Ideally, crossing spacing along major roads would match the density of the pedestrian and bicycle grid to either side.



Photo | paseo in residential neighborhood

Intersections

Street intersections provide a natural place for pedestrians and bicyclists to cross busy streets, especially when vehicle traffic is controlled by a traffic signal or stop signs. Large, busy intersections can also be intimidating for pedestrians and bicyclists, and intersections with multiple turning movements create multiple potential conflict points between vehicles and pedestrians or bicyclists. In these circumstances, intersections can function as a barrier in a multimodal transportation network.

Guidelines for intersections

- Keep intersection compact and small, to minimize crossing distances and crash exposure for pedestrians and bicyclists.
- Make crossings simple and easy to understand, and place crosswalks where pedestrians want to cross and where drivers will see them. At skewed or other awkward crossings, balance the most direct route for pedestrians against the shortest crossing distance.
- Avoid slip lanes and other free flow turning movements, which allow vehicles to turn at higher speeds. Slip lanes are not appropriate for urban settings and should be used sparingly in suburban contexts. Where they are used, a two-stage design that has a shallow approach angle before the crosswalk and a tighter angle after, is a more pedestrian friendly configuration.
- Large corner radii at intersections increase crossing distances, encourages high speed turns, and makes it challenging to locate curb ramps. Keep radii small, and measure effective radius, which is larger when there is on street parking or bike lanes.
- Curb extensions or bump-outs reduce crossing distances, make pedestrians more visible, slow right-turning vehicles, and provide space for streetscape elements.
- Refuge islands break long or complicated crossings into separate components and reduce the cross-at-once distance for pedestrians.
- Curb ramps are required by ADA but beneficial to all pedestrians. Two ramps are preferred to a single apex ramp in most circumstances. Ramps should be in alignment with both the sidewalk and crossing. Curb ramps should be provided on all corners of an intersection, including the opposite side of T intersections.
- Sidewalk alignment. The sidewalk and crosswalk should be in alignment as much as possible. Misaligned crosswalks, which are often an outcome of large corner radii, create out-of-direction travel for pedestrians and place crosswalks where they are not expected.

Traffic signals

Traffic signals are typically used at intersections with higher volumes to assign right-of-way and regulate the flow of traffic. Signals make accommodation for crossing pedestrians, but they do not guarantee safety.

Guidelines for traffic signals

- Push buttons. Most signalized intersections are equipped with pedestrian push buttons, which means that the walk signal is not activated until the

button is pushed. Signals in the Downtown area, on the other hand, operate in pedestrian recall mode and do not require a pedestrian to push a button. At any intersection, where there are high pedestrian volumes, pedestrian recall should be considered in place of the push button. An example might be the FUTS crossing along Route 66 at Ponderosa Parkway, which has pedestrian and bicycle crossings most cycles.

- Accessible pedestrian signals. **Include audible walk/don't walk information** for blind and visually impaired individuals. These should be the standard for all intersections.
- Detection. Although most traffic signals in Flagstaff use detection technology that is capable of recognizing bicycles, very few are set to detect them. This creates a problem for bicyclists and encourages cyclists to disregard red lights. By default, all traffic signals should be set to detect bicyclists.
- Railroad preemption. At signalized intersections along Route 66, the green signal for cross traffic is preempted when a train is present to prevent putting vehicles in conflict with a train. Pedestrian crossings at these locations should not be pre-empted, however, as the pedestrian movement does not conflict with the track crossing.
- Lead pedestrian/bicycle interval. Provides a few seconds head start on the green light for pedestrians or bicyclists. Lead intervals should be considered as a countermeasure where there is high incidence of right and left turn crashes. Lead bicycle intervals are also used at protected intersections.
- Right on red restrictions. Right-turning vehicles are a significant cause of pedestrian and bicycle crashes, because a driver's attention is looking for gaps in traffic to the left, not pedestrians and bicyclists to their right. Right on red restrictions could be considered at intersections with high numbers of right turn crashes. Conditional restrictions are also possible, like when children are present, during certain times of the day, and when the pedestrian push button is activated.
- Pedestrian scramble mode. A signal phase where all traffic is required to stop, but pedestrians can cross in any direction or diagonally. Pedestrians must wait longer for a signal, but there are safety benefits because conflicts with turning vehicles have been removed. Pedestrian scramble mode may be an option at intersections with very high volumes of pedestrians.



Photo-other | pedestrian scramble intersection (Prescott?)

Roundabouts

Over the past decade or so, roundabouts have been installed at five different intersections in Flagstaff, and more are planned. Roundabouts can be more efficient than a signalized intersection, because they allow vehicles to keep moving. There are fewer conflict points, and no left turns, so serious crashes are reduced. Roundabout efficiency can help avoid large multilane intersections.

For pedestrians, crossings can be safer and more manageable than at conventional signalized intersections. Traffic is slowed, crossings are broken into individual segments, there are few traffic lanes to cross, and fewer points of conflict.

For bicyclists, there are two options for riding through a roundabout. Bike lanes do not continue through a roundabout, so a cyclist either takes the lane and proceeds through as a vehicle or exits onto the adjoining sidewalk to proceed through as a pedestrian. In the first case, many bicyclists will only feel comfortable where traffic speeds and volumes are low through the roundabout. For the second case, it is important to include adequate accommodation for bicyclists who choose to leave the roadway.

Photo | roundabout at... with peds or bikes

Guidelines for roundabouts

- Multi-lane roundabouts. Operate in a way that is fundamentally different than single lane roundabouts. Multiple lanes make it difficult to slow traffic, and there are more lanes to cross. As a result, some of the safety benefits for pedestrians and bicyclists may be compromised. Where they are used, additional consideration must be given to pedestrian and bicycle safety.

- **Slip lanes.** Are sometimes used when there are high volumes of rights turning vehicles to remove them from the roundabout and increase efficiency. However, slip lane geometry does not require drivers to slow, putting pedestrians and bicyclists who must cross the slip lane at increased peril.
- **Accessibility.** Roundabouts can be challenging for people who are visually impaired and rely on listening for gaps in traffic to know when it is safe to cross. Roundabouts may have fewer gaps, and they are harder to detect because traffic is always moving. Roundabouts are also challenging for people who need additional time to cross. One option is to add pedestrian hybrid beacons at roundabout crossings, which require vehicles to stop for pedestrians and bicyclists.
- **Bicycle accommodation.** In most cases, roundabouts should include exit/entry ramps for cyclists on all the approach streets, and a minimum 10-foot path around the roundabout to support shared pedestrian and bicycle use. The one potential exception is roundabouts on local streets that do not have or warrant bike lanes.
- **Protected roundabouts.** The multi-use path around the perimeter and crosswalks on the approaches are divided into a pedestrian side and a bicycle side, affording a higher level of accommodation for both. Protected roundabouts should be used along primary and secondary bikeways and wherever protected or separated bike lanes are used on the streets leading into the roundabout.

Graphic | Protected roundabout

Driveways

Every driveway crossing along a street introduces an additional conflict point for pedestrians and bicyclists. Attention to design, however, can help mitigate potential risks.

Guidelines for driveways

- **Access management.** Consolidating or closing unnecessary driveways is generally beneficial to all users and can improve safety and comfort for pedestrians and bicyclists. Along busy streets, a few streets at key locations are preferable to a multitude of driveways.
- **Driveway apron.** Where driveways intersect the street, the transition should be designed as a driveway with concrete wings instead of as a street with a radius. The wing design allows the sidewalk to be continuous and level across the driveway, which provides a visual clue to drivers that they are crossing a sidewalk and makes them more aware of pedestrians. A radius

design encourages higher speed turn for both entering and existing vehicle and encourages drivers to be less cautious about crossing pedestrians or bicyclists. A large radius also makes it more difficult to align curb ramps.

- Sidewalk location. A full-width sidewalk should be located behind the driveway apron. The apron typically has a severe cross slope, which is uncomfortable for walking and problematic for those who use wheelchairs.
- Width. Driveways should not be wider than needed; wide driveways encourage higher speeds and increase pedestrian exposure.
- Right-in/right-out. A straight sidewalk alignment should be maintained through right-in/right-out driveways. Avoid aligning the sidewalk around the back of the right-in/right-out entry, as this creates awkward out-of-direction alignment for pedestrians. Design should slow speeds for entering or exiting vehicles and **place crossings within the driver's field of view.**

Pedestrian and bicycle facilities

Sidewalks

Sidewalks are the most basic and important facility for walking and a fundamental component of a pedestrian-friendly community. Sidewalks are valuable for a number of reasons, but they are sometimes taken for granted or overlooked:

- Provide a place for pedestrians, away from vehicles, that makes it comfortable and appealing to walk.
- Encourage people to be more active; people who live in neighborhoods with sidewalks are more likely to be active every day.
- Enhance safety for walking; sidewalks reduce pedestrian crashes up to 88 percent.
- Benefit property value; houses with sidewalks have been found to sell for more, and in less time, than houses without sidewalks.
- Provide public/community space that promote social interaction and make neighborhoods more vibrant.
- Promote equity in neighborhoods; all residents can use sidewalks, regardless of age, ability, or income.

Photo | nice sidewalk

Guidelines for sidewalks

Width. The current minimum required width for sidewalks in Flagstaff is five feet for local and collector streets and six feet for arterials, **as indicated in the City's Engineering Standards.** The minimum width increases for sidewalks in transect zones. In general, minimum required sidewalk widths in Flagstaff should be increased. Five feet is adequate for low density residential areas, but six feet is more suitable for most

Suburban
Urban
Activity centers

Local
Collector
Arterial

Residential
Commercial
Industrial

Adjacent features. **What's alongside the sidewalk can also affect its usability** and perceived width. On the street side, sidewalks adjacent to vehicular travel lanes will feel narrower and less comfortable. Vertical features, such as walls, fences, or landscaping against the sidewalk will reduce its effective width. In these cases the sidewalk should be made wider or a buffer should be included.

Sidewalk completion. The City's **policies and standards** direct that sidewalks are a community asset that should be present on all streets. The decision whether sidewalks are needed should therefore not be made on a case-by-case basis.

Low volume streets. For almost all streets, even quiet residential streets, sidewalks are needed along both sides. On low volume streets, pedestrians may feel comfortable and choose to walk in the roadway when there are no vehicles, but when a vehicle is present pedestrians should have the option to retreat to a sidewalk.

One side. Sidewalks should always be included on both sides of the street. Patterns of pedestrian use and movement generally include both sides of the street, even when pedestrian desire lines are not obvious or immediately apparent. Where sidewalks are missing along one or both sides of busy streets, invariably a **"goat path" forms where the sidewalk should be.** In neighborhoods where sidewalks are missing, it is not uncommon to see people walking along the edge of a street, in a bike lane, or on the shoulder.

Buffers. Some form of buffer between pedestrians and motor vehicle traffic is essential to pedestrian comfort, especially along roadways with higher speeds

and volumes. A parkway or furnishing strip, bike lanes or parking lanes create horizontal space from traffic. Vertical elements, including street trees, utility structures, parked cars, and streetscape elements provide a more substantial buffer. Where sidewalks are adjacent to parking lots, there should always be a buffer of at least five feet between the sidewalk and the parking lot, preferably landscaped.

Street trees and landscaping. Street trees and landscaping are significant enhancements for the pedestrian realm; they provide shade and weather protection, create a more appealing and comfortable place for pedestrians, and provide a buffer and protection from vehicles.

Obstructions and encroachments. The pedestrian through zone is intended for pedestrian travel, and should follow a direct alignment, be continuous, and free of encroachments and obstructions. Obstructions and discontinuities are difficult to navigate and can be like an obstacle course. For those with mobility limitations, especially people with vision impairment, the sidewalk may be near unusable. Outdoor dining, sales displays, signing, and other encroachments should be kept out of the through zone.

Meandering sidewalks. Curving alignments are sometimes used to add interest, but often do little more than add extra distance and an indirect alignment to pedestrian travel. Meanders should be used judiciously and only for a real purpose; curves should be gentle, so the path of travel feels direct and natural.

Bike lanes and shoulders. Where sidewalks do not exist, bike lanes and shoulder are often used for walking, especially in rural areas. In urban and suburban settings, however, they are not adequate as a pedestrian facility.



Photo | generous sidewalk



Photo | narrow sidewalk



Photo | side encroachment



Photo | goat path

Photo | sidewalk adjacent to parking lot



Photo | unbuffered sidewalk on busy street



Photo | outdoor dining obstructions (Downtown and Sawmill)



Photo | meandering sidewalk or abrupt angle



Photo | people walking in street

Pedestrian zones

Sidewalks should be thought of as more than just the strip of pavement where people walk. Pedestrian realm is more encompassing term that comprises four distinct zones:

- Pedestrian through zone. Describes the primary pathway or walking surface for pedestrians that runs parallel to the street

- **Furnishing zone.** The strip of land between the street and the through zone. In urban areas, the furnishing strip is the preferred location for a variety of street elements, such as light poles, benches, and fire hydrants. In a suburban context it is referred to as the parkway.
- **Frontage zone.** Refers to the area from the through zone to the front of buildings. Various private elements belong here: sidewalk cafes, storefronts, and outdoor sales. This zone also supports the public realm in the form of seating and gathering areas, public art, plazas, and streetscaping.
- **Buffer zone.** Additional space between the furnishing zone and vehicle travel lanes on the street. Where present, this area includes on-street parking, bike lanes, and curb extensions.

Graphic | sidewalk zones from NACTO

Guidelines for pedestrian zones

- All four zones are important elements and should be considered as integral to the sidewalk.
- The function of each zone should be kept separate, especially in urban areas. For example, the furnishing zone should not be used for pedestrian movement because the through zone is obstructed or restricted. Seating, sales, and display areas should be limited to the frontage zone and not encroach into the through zone.
- The character of the furnishing zone should vary according to context. In urban areas and activity centers, the furnishing strip is more appropriate as a hardscaped element and space for various amenities and utilities. In suburban settings, the parkway can be a landscape feature.
- The frontage zone is an important but often overlooked component of the streetscape. A frontage zone should always be present at the back of the sidewalk; buildings or parking lots should not abut the sidewalk. A well-designed frontage zone enhances the streetscape and pedestrian experience.
- In urban areas and activity centers, hardscaping and activity in the frontage zone can significantly add to the appeal of the sidewalk. Examples of activities or uses in the frontage zone include seating areas, outdoor dining, plazas, public art, and outdoor sales or display.
- In suburban areas, the frontage zone can be a landscape buffer or a natural area between the sidewalk and a building or a parking lot. In the latter case, the frontage zone serves an important function to separate the sidewalk from the parking lot. Preserving native trees and vegetation in the frontage zone promotes a natural feel for the streetscape.

- The buffer zone will not always be present in all circumstances, but it should be incorporated into the street whenever possible.

Furnishing strips and parkways

Parkways and furnishing strips, as described in the section above, serves a number of valuable functions for pedestrian accommodation:

- Serves as a buffer between pedestrians and the street and contribute to pedestrian safety and comfort.
- Provides a place to store snow cleared from the street. When a parkway is not present, snow is either plowed onto the sidewalk or into the bike lane.
- Collects cinders in the winter and helps keep them away from the walkway.
- Keeps construction signs, trash bins, and other obstructions from blocking the sidewalk or bike lane.
- Creates space for street trees, utilities, and streetscaping.
- Makes it easier to maintain accessible sidewalk grades across driveways and curb ramps.

Guidelines for parkways

- The furnishing strip or parkway is sometimes eliminated in street projects or new development, particularly in circumstances where right-of-way is restricted. For infill or retrofit projects the parkway or furnishing strip should only be eliminated for good cause and when no alternatives exist. Mitigation should be required, such as a wider sidewalk or other buffers. In greenfield development the furnishing strip or parkway should always be provided.
- Extra width or additional buffering elements may be needed on high-volume and high-speed streets to promote pedestrian comfort.

Bikeways

Bikeways are a network of linear transportation corridors intended to accommodate bicycle use. They are comprised of a variety of facilities, such as bike lanes, protected or separated facilities, FUTS trails, and crossings and intersection treatments to ensure comfort and safety for all users. The network is intended to be comprehensive, so bicyclists can travel comfortably and easily to destinations and neighborhoods throughout the community.

For more detailed information, refer to the [Bikeways Plan](#).

Low stress

A low stress bikeway is one where most people will feel safe and comfortable riding a bicycle, regardless of their ability or circumstance.

More comfortable, low-stress bikeways are reliant on providing separation between bicyclists and traffic. Riding on high-volume, high speed streets is not comfortable and often does not feel safe for most people, even when there is a bike lane. On these streets, bike facilities that are separated or protected from traffic are much more comfortable for most people.

Low stress bikeways provide numerous advantages over conventional bike lanes, most importantly because they appeal to a much broader segment of the population and as a result, make bicycling more viable as a transportation option.

Hierarchy

Flagstaff's planned bikeways network includes a hierarchy of four bikeway classes or levels:

- Primary or first level bikeways are the highest level and represent four main commuter routes for crosstown bicycle travel into the core of Flagstaff from the four cardinal directions.
- Secondary or second level bikeways are the other main routes that provide crosstown and regional travel for bicycle commuters, as well as access to major destinations. Seventeen secondary bikeways are planned.
- Third level bikeways provide connectivity between neighborhoods and districts, as well as access to primary and secondary bikeways.
- Fourth level bikeways consist of local routes that provide bicycle travel within neighborhoods, access to local destinations, and connectivity to higher-level bikeways.

This hierarchy helps guide a variety of policies, decisions, and practices for bikeways. Primary and secondary bikeways are prioritized for construction and implementation, are more likely to include protected or separated facilities, and are considered priority routes for maintenance, snow clearing, sweeping, and closures. The hierarchy also plays a valuable role in wayfinding.

[Map | Bikeways network by hierarchy](#)

Facilities

The planned bikeways network is comprised of a variety of facilities, which are categorized based on the extent of separation from traffic.

- Shared streets. On low speed/low volume streets bicyclists typically share the street with vehicles. Shared facilities include bike routes, shared lane markings, and bike boulevards.
- Dedicated facilities. Facilities such as bike lanes and shoulders, which are still within the roadway but bikes have their own designated space.
- Separated or protected facilities. Higher-level facilities, where space for bikes is separated from traffic, either by a vertical physical barrier or horizontally by space. Includes protected and separated bike lanes, cycletracks, and FUTS trails.

Intersections and crossings are also critical components of a low stress bikeways network.

[Map | Bikeways network by facility type](#)

Guidelines for bikeways

- Continuity. A low stress network is most functional when most of the network is comfortable and there are no gaps or high stress segments. One difficult intersection, or one busy road segment without adequate facilities, may be enough to discourage someone from riding.
- Bike lanes. Standard bike lanes have been, and will likely continue to be, the primary facility and most basic accommodation of bicycles in the network. However, a comfortable bicycle network should include separated or protected lanes, as well as other specialized facilities, to better accommodate bicycle travel.
- Minimum operating space for bikes. Bikes require a minimum width of four feet of clear, uninterrupted space to operate safely. Longitudinal gaps in the pavement, as is common at the joint between the asphalt road and the concrete gutter pan, are not part of this operating width. Vertical barriers along the edge, whether permanent or temporary, also impinge on operating width. Where on-street parking is allowed adjacent to the bike lane, operating width should be outside of the door zone for parked vehicles.
- Side by side travel with vehicles. A minimum width of 14 feet is necessary for bicycles to ride safely alongside motor vehicles. This width includes minimum operating space for both the bicyclist and vehicle, as well as a safe passing distance of three feet. Where there is less than 14 feet of width, it is legal and safer for bicyclists to take the lane. For bike lanes, the combined width of the bike lane and travel lane should never be less than 14 feet.

- Intersections and crossings. Safe and comfortable intersections and crossings are a crucial element of the bicycle network, as 60 percent of all bicycle crashes in Flagstaff occur at intersections. Negotiating busy intersections can be a significant source of stress for bicyclists. Bicycle accommodation should always continue through the intersection and can include a variety of innovative intersection treatments that enhance both comfort and safety for bicyclists.
- Protected intersections and roundabouts. Protected or separated bike lanes and FUTS trails along streets may preclude bicyclists from making left turns as a vehicle. This can be resolved by including two-stage left turn boxes at smaller intersections, and protected intersections or roundabouts at major junctions. Protected junctions should be included wherever protected or separated bicycle facilities are used. Most bicyclists will prefer protected intersection designs, because they remove bicyclists from traffic and make it much easier to travel through busy intersections

Graphic | protected intersection

- Parallel routes. In some cases it may be beneficial to provide a parallel route as an alternative to major roadways, allowing cyclists to use adjoining streets or more comfortable separated facilities. Parallel routes should be planned with caution, however, as they make it more difficult to access destinations on the main route, may not be as direct or continuous as the main route, and may introduce additional difficult crossings at busy streets. Parallel routes also do not eliminate the need for bicycle accommodation on the main route. Candidate corridors in Flagstaff include Milton Road, Highway 89, and Humphreys Street.
- FUTS trails. FUTS are an essential component of the bikeway network, in part because they are separated from traffic and in many cases completely independent of the street system. However, in order to function for bicycle commuting, FUTS trails should be aligned directly to minimize out-of-direction travel, designed to allow higher-speed commuting, paved for year-round use, and planned to minimize conflicts with pedestrians and other users.
- Two-way facilities. Facilities that allow two-way bicycle travel on one side of the street, including cycletracks and FUTS trails, can create additional conflict points with cross traffic on side streets and driveways. There are also awkward transitions between two-way and one-way facilities, unless protected intersections are provided. Having bicycle facilities only on one side of the street may also make it more difficult to reach destinations on the opposite side of the street. Consequently, locations for two-way facilities should be selected carefully to minimize issues, like street segments with few side street and driveways on one side, and few destinations on the other.

- Sidewalk riding. Many bicyclists who do not feel comfortable in traffic will choose to ride on the sidewalk, even though this can be significantly less safe in some circumstances. More comfortable facilities, including protected or separated lane, and more crossings along busy streets, will help reduce the incidence of sidewalk riding.
- Conflicts with pedestrians. Design of shared use facilities like FUTS trails, should minimize potential conflicts with pedestrians. Where high numbers of both pedestrians and bicyclists are expected, a divided FUTS design will separate the two users. Where separated bicycle facilities cross sidewalks, such as at intersections, intentional design can help reduce conflicts.
- Maintenance. On-street bicycle facilities, like standard bike lanes and buffered bike lanes, can be maintained as part of the roadway, including snow clearing, sweeping, and resurfacing. Protected bike lanes are narrower than a traffic lane and will need special equipment for plowing and sweeping. Separated facilities may be wide enough to be plowed and swept with equipment we already have, like FUTS trails, but this introduces an additional maintenance obligation. Additional striping and pavement markings will increase on-going maintenance costs
- Phasing. As it is not feasible to build out the entire bikeways network at once, phasing should concentrate first on high profile facilities, and emphasize continuity and closing gaps. **We don't** need to fix all the problems at once, but we should address the most important ones. Significant segments of the planned bikeways network are reliant on other projects including major roadway projects, private development, and the Rio de Flag flood control projects. For these segments we need to wait, but we should make plans to implement what we can in the meantime.
- Wayfinding. Bikeway signing, as described in the section below, is a critical element of the bicycle network that pulls bikeways together into comprehensive system. Consequently, wayfinding signing needs to be a first-priority project, and we should sign what we have even if everything is not complete.

Bicycle parking

At its most basic level, bike parking encourages people to bicycle because it provides a secure location to store their bicycle when bicyclists reach their destination. When bike parking is not available, inconvenient, or not functional, people may choose a different mode. Additionally, accommodating bicycles eliminates the clutter, hazards, and damage that can result from unintended or unplanned bicycle parking

Photo | bike parking

Guidelines for bicycle parking

- **Rack design.** The overall functionality of bike racks varies considerably based on its design. Poorly designed racks can cause damage to bikes, allow bikes to tip over, result in disorganized clutter, are not secure, and will not be used. The Zoning Code has specific requirements for bike racks to ensure their functionality.
- **Location.** Bike racks should be placed in a convenient, visible, active, well-lit location in proximity to the front door of the building it serves. Bike racks should not block sidewalks and pedestrian ways. Planning for bike parking should be part of the site planning process, not an afterthought.
- **Long term bike storage.** At locations where bikes will be left or stored for longer periods of time, such as employment centers, student housing, transit centers, and high density residential development, there is a need for greater security and protection from the weather. Options for long term parking include shelters, lockers, cages, and indoor rooms.

Photo | long term bike parking example

- **Enhanced bike parking.** Features that go beyond the standard bike rack serve as a site amenity and encourage bicycling. Enhancements include covered or sheltered locations, bike lockers and cages, indoor rooms, additional capacity, and incorporation of artistic elements.
- **Special events.** Providing additional, temporary bike parking for special events encourages bicycling, minimizes traffic impacts, and reduces demand for vehicle parking. Some opportunities for special event parking include encouraging community groups to sponsor valet bike parking, adding permanent bike parking at event venues, and working with event organizers to provide banks of temporary bike parking.

Photo | bike parking at community market

Bicycle collectives

A bicycle collective – or community bike shop, bike kitchen, or bike co-op – is typically a non-profit, community-based facility that provides a variety of services for low-income populations, such as inexpensive bicycles, low-cost or free repairs, rentals, tool libraries, bicycle and parts recycling, earn-a-bike programs, and safety and maintenance classes. Such facilities increase bicycle access to underserved populations that rely on walking and bicycling for mobility.

Bike stations

Bike stations or hubs are facilities that provide a variety of bicycle services, typically intended for commuter cyclists. Services might include secure indoor

bicycle storage, showers and changing rooms, repair services or self-serve repair stands, sale of basic parts like inner tubes, lights, or locks, and commuter assistance and information. Stations and hubs are scalable and can range from a basic self-serve facility to a deluxe facility that has regular staff and offers repair services, retail sales, and even a coffee shop. Candidate locations include **Mountain Line's planned** downtown connection center, or a future parking garage somewhere downtown.

FUTS trails

The Flagstaff Urban Trails System, or FUTS, is a city-wide network of shared use pathway that are used extensively by walkers, bicyclists, and other users for both recreation and transportation. The current network of FUTS, which comprise about 58 miles of trail, is an important pedestrian and bicycle facilities and a complement to on-street networks.

About half of the miles of existing trails are paved, either in concrete or asphalt, and half consist of a hard-packed, aggregate surface. FUTS trails are generally eight or ten feet in width to allow mixed pedestrian and bicycle traffic.

FUTS trails offer a diverse range of experiences for walking and biking; some trails are located along busy streets, while others traverse beautiful natural places - canyons, riparian areas, grasslands, meadows, and forests - all within the urban area of Flagstaff. The system connects neighborhoods, shopping, places of employment, schools, parks, open space, and the surrounding National Forest, and allows users to combine transportation, recreation and contact with nature.

Implementation of a robust bikeways network means that we will no longer need to rely on FUTS trails as an alternative along busy streets for bicyclists who do not wish to ride on the street. As a result, the FUTS system can function as a complementary pedestrian and bicycle network that is somewhat independent of the street network. Even in this new configuration, however, FUTS will continue to be an important bicycle facility.

Guidelines for FUTS trails

- Transportation and recreation. FUTS are used for both commuting and recreation, and work best when they serve both functions: when a FUTS can be used for meaningful travel and access to destinations, but also provide an enjoyable and pleasant experience.
- Bikeways element. FUTS trails are an essential component of the bikeway network. For many people they are the most comfortable bicycle facility, because they are separated from traffic and in many cases located completely away from roadways.
- Complement to on-street facilities. On-street links on sidewalks and bikeways will always be necessary to complement the FUTS system and form

complete networks for walking and biking. As a result, seamless and frequent integration of walking, biking, and trails networks is crucial. FUTS trails should never be substitutes for on-street bicycle facilities.

- **Crossings.** Getting across busy streets is vital to the FUTS network. Because FUTS are separated from traffic, crossings are the only location for potential conflicts with vehicles. FUTS crossings are often at midblock locations and have no traffic control. Design for crossings needs to accommodate multiple users, including pedestrians, bicyclists, and other trail users. Should always be marked
- **Greenways and open space.** There is substantial overlap between the existing and planned FUTS network and a potential linear greenways system of washes, hillsides and canyons throughout the city. The presence of natural areas along a FUTS greatly enhances its appeal and the experience for users, and it provides a way to access nature at a local, neighborhood level. Greenways also bring numerous benefits to neighborhoods and urban areas.
- **Forest access.** Providing a way for people to get to the surrounding forest is an important function of FUTS. In some cases, FUTS trails connect directly to formal recreational trails, but often they are informal connections from neighborhoods to the forest. While there are numerous existing points of access to the forest, few are improved or have property rights. Without a plan for their protection, there is a risk that they will be closed.

Trailheads. Trailheads should be located in locations that optimize access to trail networks that allow travel in a variety of directions and a variety of recreation trail experiences. Trailheads should be located at least every 5 miles along the Flagstaff Loop Trail.

- **Connections to outlying communities.** **Non-motorized travel to Flagstaff's** outlying communities, including Doney Park, Timberline-Fernwood, Fort Valley, Bellemont, Kachina Village, and Mountaineer, is often difficult for walking and biking because the main routes of travel are highways and interstates. FUTS trails would be a good solution but would be expensive due to the long distances. Using existing forest roads might be a feasible, lower-cost option. Planning for these connections would be a cooperative project with Coconino County.

Crossings

Crossings are an essential component of the pedestrian and bicycle network, and the ability to cross a street comfortably and safely is as important to walkability and bicycle-friendliness as walking or biking along the street.

Providing a safe and comfortable way for pedestrians and bicyclists to cross roadways is a fundamental obligation of the City. Crossings should never be

closed or omitted because of perceived safety concerns. Our approach should be to make it safe for people to cross, rather than prohibiting or discouraging crossings because we think its unsafe.

Pedestrian behavior is a function of human nature. Pedestrians desire and need to cross the street for a reason: to reach destinations on the other side. Where formal crossings are not present or are spaced far apart, pedestrians will cross where it is most convenient, even if it involves an element of risk.

Photo | representative crossing

Enhanced crossings

Enhanced crossings are those that include any features that help slow traffic, shorten crossing distances, break crossings into parts, increase visibility, or in general make the crossing safer and more comfortable. Enhanced treatments may include:

- Median islands
- Curb extensions
- Landscape features
- High-visibility markings
- Advance warning signing
- Pedestrian-scaled lighting

Enhancement also include any modifications to the street that serve to slow traffic in advance of the crossing increase safety. Enhancements can be used at any crossing location; however they are most beneficial and sometimes needed at mid-block and uncontrolled crossings.

Beacon crossings

Crossing beacons are pedestrian-activated flashing lights that are appropriate on streets where the width, volume, and speed of traffic make crossing difficult without the aid of the beacon. Two types of pedestrian-activated flashing beacons are presently in use in Flagstaff:

- Round or rectangular rapid flashing beacons (RRFB). Feature an amber lashing light that draws attention to the crossing and reminds drivers to yield to pedestrians in the crosswalk.
- Pedestrian hybrid beacon (PHB). A traffic control device with red lights that require vehicles to stop for pedestrians. It is sometimes referred to as a Hawk crossing.

The primary difference between the two is that an RRFB is intended to alert drivers to the presence of a crossing pedestrian and remind them to yield. The beacon does not change the law; pedestrians are still obligated to enter the

crosswalk safely and drivers are required to yield to them. A PHB, on the other hand, is a traffic control device that requires drivers to stop when the red light is solid, and proceed when clear after stopping when the red light is flashing.

Photo | RRFB

Photo | PHB

Crosswalks

Per Arizona Revised Statutes, legally defined crosswalks exist at all street intersections, whether or not they are painted with crosswalk markings. Legal crosswalks also exist at non-intersection, mid-block locations when they are distinctly marked.

Where crosswalks are marked, their purpose is to indicate to pedestrians where to cross, and to indicate to drivers where to expect pedestrians. Transportation planners and engineers are sometimes reluctant to mark crosswalks, for a variety of reasons such as perceived safety concerns, impacts on traffic flow, and maintenance obligations. On the other hand, many pedestrians see marked crosswalks as a benefit and acknowledgement that they are rightful and legitimate users of the roadway.

Simply marking a crossing does not make it safer. When a street is unsafe to cross, it is typically due to a combination of factors including vehicle speed and volume, crossing distance, sight distance, visibility, and driver expectation. Making the crossing safer may require other improvements to mitigate these conditions. Contrary to popular belief, there is little evidence to support the notion **that marked crosswalks give pedestrians a “false sense of security.”**

Guidelines for crossings

- Midblock crossings. In some cases midblock locations can be safer than intersection crossings because there are fewer potential conflict points for pedestrians from turning vehicles. On quiet streets, it may be sufficient to provide markings for a midblock crossing, but on faster, busier streets enhancements or beacons may be necessary.
- Crossing spacing. Ideally, the maximum distance between crossings is determined by the desired density of the pedestrian grid, as described in the Street network and connectivity section above.
- Textured crosswalks. Textured paving in a crosswalk is rarely effective as a crossing enhancement; texture alone does little to improve visibility, and as a tactile warning to drivers it should be placed in advance of the crosswalk, not in it. In addition, textures are sometimes difficult for small wheels (wheelchairs, strollers, luggage) and can be a tripping hazard. A preferred solution is to use texture before and after the crosswalk, even throughout the rest of the intersection, and leave the crosswalk itself untextured.

- Two stage crossings. A center refuge island, which breaks crossings into two stages, should be considered for enhanced crossings, midblock crossings, and beacon crossings. The center island offers several safety benefits for pedestrians by simplifying the crossing, shortening crossing distances, and making both the crossing and the pedestrian more visible.
- Offset or Z alignment. An offset or Z-shaped alignment for the pedestrian pass-through on a crossing island requires pedestrians to turn in the direction of on-coming traffic before crossing the second leg. This can enhance safety by giving pedestrians a better view of traffic and making them more visible.
- FUTS and bicycle refuge. For FUTS crossings and other crossings that will be used by bicyclists as well as pedestrians, the pass-through should be designed to accommodate bicycle movement. Tight, right angles in the pass-through alignment cannot be negotiated by bicyclists. The width of the center island should more than six feet to fit a typical bicycle and provide a minimum level of comfort for pedestrians. Bicycle-specific crossings are described in the Bikeways Plan.
- Center push button. Two-stage beacon crossings often require pedestrians to push a button in the island to activate the beacon for the second half of the crossing; however, pedestrians are frequently not aware of this. A preferred solution is to use passive detection in the island to activate the beacon automatically when a pedestrian passes.
- Hot response. **A “hot response” button means that the beacon is activated quickly after the button is pushed.** If it takes too long for the signal to activate, the pedestrian may find a gap in traffic and cross before the beacon begins flashing. In that case, drivers may see the flashing beacon but no pedestrian.
- Raised medians. A raised median along the center of the street can be an effective informal crossing aid for pedestrians. Raised medians have been found to reduce crossing crashes by more than 40 percent, in part because the crossing is broken into two simpler segments with a refuge in the middle. Candidate roadways for raised medians have few formal crossings and no obvious locations where there is concentrated demand, so **pedestrians are likely to “sheet flow” across the roadway.**
- Prohibited crossings. Pedestrian crossings should be provided on all legs of the intersection. When crossings are prohibited, pedestrians must make three crossings in place of the one that is closed. This increases exposure and makes it more likely that they will cross against the light or find a midblock location.

- Crossing warrants. Are used by both the City and ADOT to determine if an enhanced or beacon crossing is needed at a particular location. Warrants include the existing number of pedestrians using the crossing, however this ignores future demand, for example if a shopping center or bus stop is built nearby, as well as latent demand if the existing crossing is unsafe or uncomfortable. Crossing warrants also tend to rely on a high volume of pedestrian crossings, so they are difficult to meet. As a result, adjustments or alternatives to the crossing warrant should be considered.

Grade-separated crossings

Grade-separated crossings refer to structures that convey pedestrians and bicyclists over or under interstates, railroad tracks, and major roads. Structures can include bridges and tunnels for the exclusive use of pedestrians and bicyclists, as well as street underpasses and overpasses that include facilities for walking and biking.

Grade-separated crossings can add significant value to the walking and biking environment by providing access across features that otherwise create barriers in walking and biking networks.

Photo | Matt Kelly Bridge

Guidelines for grade-separated crossings

- Not a substitute for at-grade crossings. Where a bridge or tunnel is built across a busy street, it should not be considered a substitute for at-grade pedestrian and bicycle crossings. In other words, pedestrians and bicyclists should not be prohibited from crossing at an adjacent intersection because a bridge or tunnel is present. Pedestrians and bicyclists should always have the choice to use the bridge or tunnel, or cross at street level if they prefer.
- Topography. Grade-separated crossings work best when existing topography allows for a structure under or over without the need for long or steep ramps to gain or lose elevation. Where ramps are needed, they should be gradual and perceived as a natural part of the trail. Ramps that are short and steep, including ramps that spiral or switchback, will discourage use.

Photo | Route 66 tunnel

- Design. Crossings that are uncomfortable or perceived as unsafe will not be used. Good design is essential to the success of a bridge or tunnel, and includes structures that are open and inviting, well-lighted, and accessible. Open structures work best, and box tunnels should be as wide and tall as possible.
- Sight distance. Tunnels should include long, straight approaches so users can see through the tunnel well in advance of entering it. When users

cannot see into the tunnel, they will not be assured that it is safe and will be hesitant to enter.

- Amenities. Features along and at both ends of a tunnel or bridge – such as plazas, landscaping, pedestrian lighting, seating areas, interpretive displays, and public art – make them more attractive and inviting to users and a neighborhood or community asset.

Photo-other | underpass with amenities

- Activity and safety. Tunnels that are well-used provide a greater sense of security and enhance safety for all users. When a tunnel is used frequently it is regularly monitored by other users, and those who seek to engage in nefarious behavior will go elsewhere.
- New construction. Pedestrian and bicycle tunnels under a street are much easier and less expensive to build as part of new roadway construction, compared to adding a tunnel as a retrofit under an existing street. It is therefore the **City's expectation** that pedestrian and bicycle tunnels will be included with new road construction in future capital projects or private development, where new grade-separated crossings under planned roads have been identified in this master plan.

Neighborhood connectors

Neighborhood connectors describe short accessways that provide pedestrian and bicycle access between neighborhoods or between neighborhoods and commercial areas and other attractors.

These connections are a useful component of pedestrian and bicycle networks; they provide convenient access for pedestrians and bicyclists between destinations, create shortcuts that reduce out-of-direction travel, and permit pedestrians and bicyclists to avoid busy streets. They tend to be popular with neighborhood residents.

Connectors are generally stand-alone facilities that are not part of larger FUTS or bikeway networks. Existing connections are built in a variety of configurations, including singletrack trails, concrete sidewalks, and aggregate FUTS trails. Some are owned and maintained by the City, while others are the responsibility of a neighborhood homeowners association. In some cases, they also function as maintenance access roads along utility corridors.

Guidelines for neighborhood connectors

- Guidelines and standards. There is often a desire to keep them informal, which means that they are often not planned with sustainable alignment and grades or built to any standards. At a minimum, connectors should be built to either sidewalk or FUTS standards.

- Ownership and responsibility. In general, connectors that are located within or primarily serve a single development should remain private. Those that serve a public function or a larger area can be considered as a public amenity under City obligation.
- Maintenance. Maintenance needs should be considered and resolved in the planning process for neighborhood connectors. The entity responsible for maintenance should be clearly identified and designated. City maintenance of connectors can be a challenge, because they are stand-alone and not part of larger systems.

Electric and micro-mobility devices

Micro-mobility technology is a rapidly evolving category of light-weight individual transportation devices, including electric scooters, e-bikes, Segways, electric skateboards, and hoverboards. Electric micro-mobility devices are more efficient, affordable, and accessible than cars, and they represent a low-carbon mode of transportation to replace cars for daily vehicle trips, including commuting and daily errands.

Electric micro-mobility devices are already present in our community, and in the coming years a variety of new micro-mobility devices will be introduced – almost all electric powered – as technology advances. **The City's challenge will** be to encourage the potential benefits to mobility of these devices without creating conflicts with pedestrians and bicyclists.

In 2019, Flagstaff City Code was revised to allow Class 1 and 2 electric bikes on FUTS trails and sidewalks, with two exceptions, the Nate Avery Trail in Buffalo Park and the Arizona Trail through the middle of Flagstaff. Class 3 e-bikes are prohibited on FUTS trails and sidewalks, and all electric bikes are prohibited on sidewalks where regular bicycles are also prohibited.

Guidelines for electric and micro-mobility devices

- There is typically an expectation that new devices will compete for the same space – sidewalks, bike lanes, and FUTS trails – that is already insufficient for pedestrians and bicyclists. However as use of these devices expands, it suggests a reduction in motor vehicle use, allowing for reallocation of roadway space away from motor vehicles to accommodate
- Increasing use of electric automobiles can substantially reduce greenhouse gas emissions but does not address other issues of single occupancy vehicle use, such as the amount of pavement taken for streets and parking lots, safety for pedestrians and bicyclists, and the overall impact on community character.

- Larger or faster electric mobility devices, such as neighborhood electric vehicles or electric motorcycles, are not appropriate to share facilities and space intended for pedestrians and bicyclists.
- Future trends may also see a movement away from vehicle ownership to transportation as a service or a subscription, and from single occupancy vehicles to more sustainable and less impactful options like transit, bikeshare, and micro-mobility devices.
- Advances in technology hold significant promise to promote mobility, especially for those with mobility challenges. Advances range from smarter traffic signal controls that are more accommodating and safer to pedestrians, to real time geographic information to help blind and low vision individuals navigate.
- Regardless of how technology advances and how it changes mobility, walking and biking will always remain as fundamental human activities and modes of transportation.

Wayfinding signing

A comprehensive system of wayfinding signing provides a number of benefits and will be an important element of walking and biking networks:

- Gives users a better and more complete understanding of walking and biking networks.
- Provides cohesiveness and organization for multimodal networks and helps pull the whole system together.
- Raises awareness of walking and biking and makes pedestrian and bicycle facilities more visible.
- Assists with navigation by helping users find the best routes.
- Overcomes a barrier for new pedestrians and cyclists.
- Makes drivers more aware of pedestrians and bicyclists

Sign types

Wayfinding sign systems typically include three different types of signs:

- Confirmation signs. Indicate to pedestrians and bicyclists that they are on a designated route.
- Route directions. Provide directions at turns and junctions in the network.

- Destinations. Provide directions, distances, and travel times to destinations.

Photo-other | example of wayfinding signing

Guidelines for wayfinding signing

- Signs and pavement markings. Comprehensive signing systems often include both. Signing and pavement markings also creates opportunities to brand the system for better recognition.
- Network integration. Signing is key to integrating the FUTS system with on-street bikeways and sidewalks.
- Pedestrian signing. Wayfinding is most commonly associated with bicycle networks, but there are opportunities for pedestrian wayfinding as well.

Appendix A Common abbreviations

▪ AASHTO	American Assn of State Highway Transportation Officials
▪ ACS	American Community Survey
▪ ADA	Americans with Disabilities Act
▪ ADAAG	Americans with Disabilities Act Accessibility Guidelines
▪ ADOT	Arizona Department of Transportation
▪ ADT	Average daily traffic
▪ APS	Accessible pedestrian signals
▪ ARS	Arizona Revised Statutes
▪ ATMP	Active Transportation Master Plan
▪ BAC	Bicycle Advisory Committee
▪ BCI	Bicycle Comfort Index
▪ LBI	Lead bicycle interval
▪ CIP	Capital Improvement Program
▪ CSS	Context sensitive solutions
▪ CVB	Convention and Visitor's Bureau
▪ DBA	Downtown Business Alliance
▪ FMPO	Flagstaff Metropolitan Planning Organization (now MetroPlan)
▪ FUTS	Flagstaff Urban Trails System
▪ GHG	Greenhouse gases
▪ LAB	League of American Bicyclists
▪ LCI	League Certified Instructor
▪ LOS	Level of service
▪ LPI	Lead pedestrian interval
▪ MOV	Multiple occupant vehicle
▪ MUTCD	Manual on Uniform Traffic Control Devices
▪ NACTO	National Association of City Transportation Officials
▪ NAU	Northern Arizona University
▪ NGO	Non-governmental organization
▪ NPS	National Park Service
▪ PAC	Pedestrian Advisory Committee
▪ PCI	Pedestrian Comfort Index
▪ PHB	Pedestrian hybrid beacon
▪ PROWAG	Proposed Rights-of-Way Accessibility Guidelines
▪ PTN	Permanent transit network
▪ ROW	Right-of-way
▪ RRFB	Round or rectangular flashing beacon
▪ RRSS	Road Repair and Street Safety
▪ SOV	Single occupant vehicle
▪ TDM	Travel demand management
▪ TIA	Traffic impact analysis
▪ TND	Traditional neighborhood design
▪ TOD	Transit oriented development
▪ TWLTL	Two-way left turn lane
▪ USFS	US Forest Service

- VMT Vehicle miles traveled